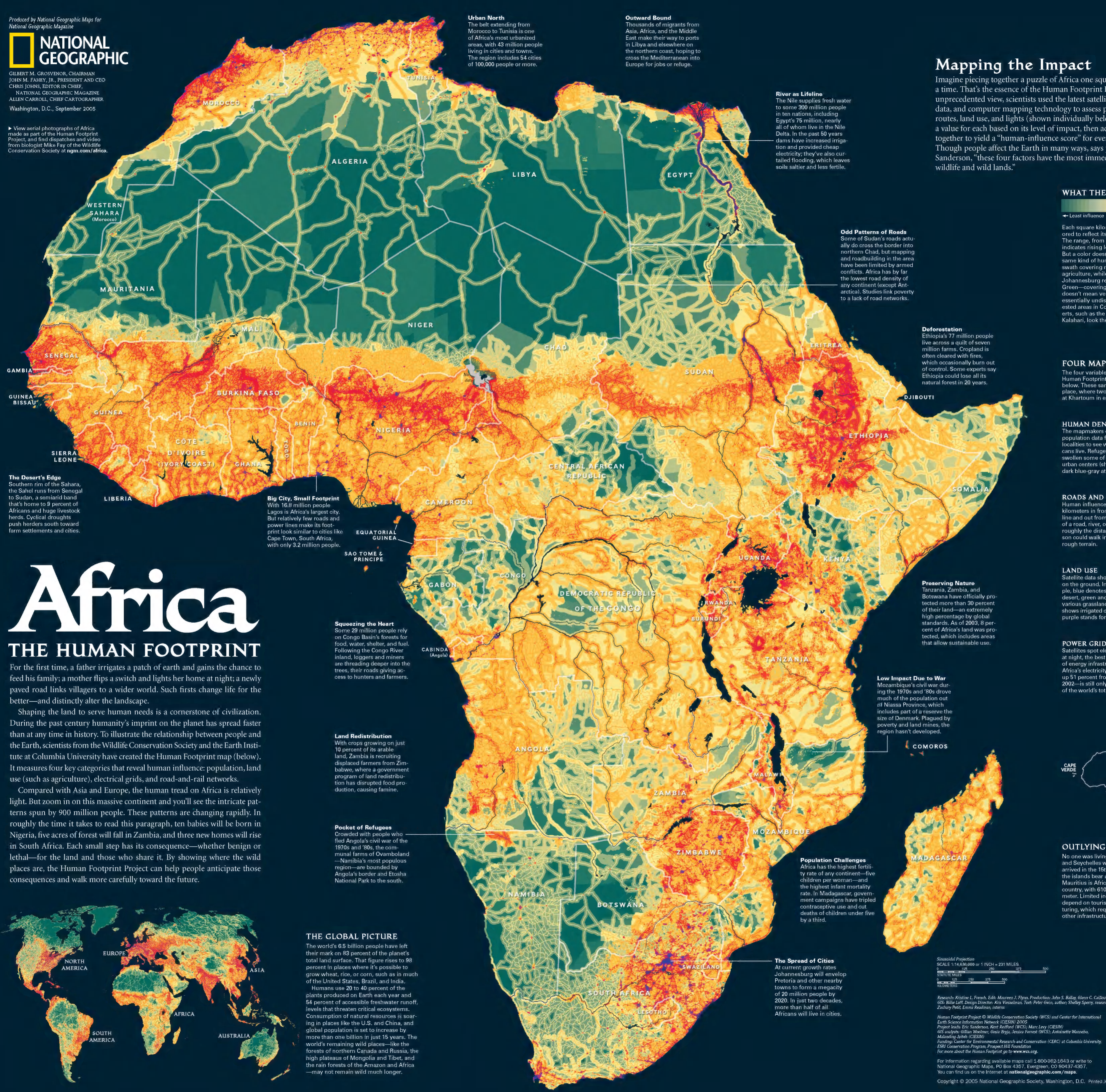
NATIONALGEOGRAPHIC.COM/MAGAZINE SEPTEMBER 2005

NATIONAL GEOGRAPHIC

Africa

Whatever you thought, think again.



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NATIONAL GEOGRAPHIC
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ALLEN CARROLL, CHIEF CARTOGRAPHER
Washington, D.C., September 2005
▶ View aerial photographs of Africa made as part of the Human Footprint Project, and find dispatches and video from biologist Mike Fay of the Wildlife Conservation Society at ngm.com/africa.
Urban North
The belt extending from Morocco to Tunisia is one of Africa's most urbanized areas, with 43 million people living in cities and towns. The region includes 54 cities of 100,000 people or more.
Outward Bound
Thousands of migrants from Asia, Africa, and the Middle East make their way to ports in Libya and elsewhere on the northern coast, hoping to cross the Mediterranean into Europe for jobs or refuge.
Mapping the Impact
Imagine piecing together a puzzle of Africa one square kilometer at a time. That's the essence of the Human Footprint Project. To create this unprecedented view, scientists used the latest satellite imagery, census data, and computer mapping technology to assess population, travel routes, land use, and lights (shown individually below). They assigned a value for each based on its level of impact, then added those values together to yield a "human-influence score" for every square kilometer. Though people affect the Earth in many ways, says project leader Eric Sanderson, "these four factors have the most immediate impact on wildlife and wild lands."
River as Lifeline
The Nile supplies fresh water to some 300 million people in ten nations, including Egypt's 75 million, nearly all of whom live in the Nile Delta. In the past 50 years dams have increased irrigation and provided cheap electricity; they've also curtailed flooding, which leaves soils saltier and less fertile.
WHAT THE COLORS MEAN
Least influence
Most influence
Each square kilometer on this map is colored to reflect its human-influence score. The range, from dark green to purple, indicates rising levels of human activity. But a color doesn't always represent the same kind of human activity. The red swath covering much of Ethiopia signals agriculture, while the red veins around Johannesburg reflect urbanization. Green—covering 40 percent of Africa—doesn't mean verdant, it means wild or essentially undisturbed, which is why forested areas in Congo and Gabon, and deserts, such as the Sahara and Botswana's Kalahari, look the same.
Odd Patterns of Roads
Some of Sudan's roads actually do cross the border into northern Chad, but mapping and roadbuilding in the area have been limited by armed conflicts. Africa has by far the lowest road density of any continent (except Antarctica). Studies link poverty to a lack of road networks.
Deforestation
Ethiopia's 77 million people live across a quilt of seven million farms. Cropland is often cleared with fires, which occasionally burn out of control. Some experts say Ethiopia could lose all its natural forest in 20 years.
FOUR MAPS IN ONE
The four variables that combine to form the Human Footprint are mapped separately below. These samples all show the same place, where two arms of the Nile converge at Khartoum in eastern Sudan.
HUMAN DENSITY
The mapmakers consulted population data for 110,000 localities to see where Africans live. Refugees have swollen some of Sudan's urban centers (shown in dark blue-gray at right).
ROADS AND RAILS
Human influence extends 15 kilometers in from a coastline and out from each side of a road, river, or railroad—roughly the distance a person could walk in a day over rough terrain.
LAND USE
Satellite data show what's on the ground. In this sample, blue denotes rock and desert, green and pink are various grasslands, red shows irrigated crops, and purple stands for cities.
POWER GRIDS
Satellites spot electric lights at night, the best indication of energy infrastructure. Africa's electricity use—up 51 percent from 1990 to 2002—is still only 3 percent of the world's total.
MOROCCO
TUNISIA
ALGERIA
LIBYA
EGYPT
WESTERN SAHARA (Morocco)
MAURITANIA
MALI
NIGER
CHAD
SUDAN
ERITREA
DJIBOUTI
ETHIOPIA
SOMALIA
SENEGAL
GAMBIA
GUINEA-BISSAU
GUINEA
BURKINA FASO
BENIN
TOGO
NIGERIA
SIERRA LEONE
LIBERIA
COTE D'IVOIRE (IVORY COAST)
GHANA
CENTRAL AFRICAN REPUBLIC
CAMEROON
EQUATORIAL GUINEA
SAO TOME & PRINCIPE
GABON
CONGO
DEMOCRATIC REPUBLIC OF THE CONGO
UGANDA
KENYA
RWANDA
BURUNDI
TANZANIA
CABINDA (Angola)
ANGOLA
ZAMBIA
MALAWI
MOZAMBIQUE
ZIMBABWE
COMOROS
MADAGASCAR
NAMIBIA
BOTSWANA
SWAZILAND
SOUTH AFRICA
LESOTHO
The Desert's Edge
Southern rim of the Sahara, the Sahel runs from Senegal to Sudan, a semiarid band that's home to 9 percent of Africans and huge livestock herds. Cyclical droughts push herders south toward farm settlements and cities.
Big City, Small Footprint
With 16.8 million people Lagos is Africa's largest city. But relatively few roads and power lines make its footprint look similar to cities like Cape Town, South Africa, with only 3.2 million people.
Preserving Nature
Tanzania, Zambia, and Botswana have officially protected more than 30 percent of their land—an extremely high percentage by global standards. As of 2003, 8 percent of Africa's land was protected, which includes areas that allow sustainable use.
Africa
THE HUMAN FOOTPRINT
For the first time, a father irrigates a patch of earth and gains the chance to feed his family; a mother flips a switch and lights her home at night; a newly paved road links villagers to a wider world. Such firsts change life for the better—and distinctly alter the landscape.
Shaping the land to serve human needs is a cornerstone of civilization. During the past century humanity's imprint on the planet has spread faster than at any time in history. To illustrate the relationship between people and the Earth, scientists from the Wildlife Conservation Society and the Earth Institute at Columbia University have created the Human Footprint map (below). It measures four key categories that reveal human influence: population, land use (such as agriculture), electrical grids, and road-and-rail networks.
Compared with Asia and Europe, the human tread on Africa is relatively light. But zoom in on this massive continent and you'll see the intricate patterns spun by 900 million people. These patterns are changing rapidly. In roughly the time it takes to read this paragraph, ten babies will be born in Nigeria, five acres of forest will fall in Zambia, and three new homes will rise in South Africa. Each small step has its consequence—whether benign or lethal—for the land and those who share it. By showing where the wild places are, the Human Footprint Project can help people anticipate those consequences and walk more carefully toward the future.
Squeezing the Heart
Some 29 million people rely on Congo Basin's forests for food, water, shelter, and fuel. Following the Congo River inland, loggers and miners are threading deeper into the trees, their roads giving access to hunters and farmers.
Low Impact Due to War
Mozambique's civil war during the 1970s and '80s drove much of the population out of Niassa Province, which includes part of a reserve the size of Denmark. Plagued by poverty and land mines, the region hasn't developed.
Land Redistribution
With crops growing on just 10 percent of its arable land, Zambia is recruiting displaced farmers from Zimbabwe, where a government program of land redistribution has disrupted food production, causing famine.
CAPE VERDE
AFRICA
SEYCHELLES
MAURITIUS
OUTLYING ISLAND NATIONS
No one was living on Cape Verde, Mauritius, and Seychelles when Portuguese sailors arrived in the 15th and 16th centuries. Today the islands bear a strong human footprint. Mauritius is Africa's most densely inhabited country, with 610 people per square kilometer. Limited in resources, it and Seychelles depend on tourism, banking, and manufacturing, which require roads, electricity, and other infrastructure.
Pocket of Refugees
Crowded with people who fled Angola's civil war of the 1970s and '80s, the communal farms of Ovamboland—Namibia's most populous region—are bounded by Angola's border and Etosha National Park to the south.
Population Challenges
Africa has the highest fertility rate of any continent—five children per woman—and the highest infant mortality rate. In Madagascar, government campaigns have tripled contraceptive use and cut deaths of children under five by a third.
NORTH AMERICA
EUROPE
ASIA
AFRICA
SOUTH AMERICA
AUSTRALIA
THE GLOBAL PICTURE
The world's 6.5 billion people have left their mark on 83 percent of the planet's total land surface. That figure rises to 98 percent in places where it's possible to grow wheat, rice, or corn, such as in much of the United States, Brazil, and India.
Humans use 20 to 40 percent of the plants produced on Earth each year and 54 percent of accessible freshwater runoff, levels that threaten critical ecosystems. Consumption of natural resources is soaring in places like the U.S. and China, and global population is set to increase by more than one billion in just 15 years. The world's remaining wild places—like the forests of northern Canada and Russia, the high plateaus of Mongolia and Tibet, and the rain forests of the Amazon and Africa—may not remain wild much longer.
The Spread of Cities
At current growth rates Johannesburg will envelop Pretoria and other nearby towns to form a megacity of 20 million people by 2020. In just two decades, more than half of all Africans will live in cities.
Sinusoidal Projection
SCALE 1:14,636,000 or 1 INCH = 231 MILES
STATUTE MILES
KILOMETERS
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For more about the Human Footprint go to www.wcs.org.
For information regarding available maps call 1-800-962-1643 or write to National Geographic Maps, PO Box 4357, Evergreen, CO 80437-4357. You can find us on the Internet at nationalgeographic.com/maps.
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NATIONAL GEOGRAPHIC

FROM AFAR, AFRICA MAY SEEM MAJESTICALLY EMPTY: THE TREMENDOUS SAHARA, THE DEEP FOREST, THE UNBROKEN PLAINS. A CLOSER LOOK REVEALS A CONTINENT WHERE NEARLY A BILLION PEOPLE AND UNTOLD NUMBERS OF ANIMALS COEXIST ON A COMPLEX SWEEP OF EARTH.

Africa

A STORIED LANDSCAPE

The Maasai bless the East African grasslands that feed their cattle, saying "stay uninhabited." Yet they know that the human tide has never stood still in Africa. Here in the birthplace of our species, people have shaped the land—and been shaped by it—for millennia.

Stretching 8,000 kilometers north to south, Africa's diverse climates and landscapes both enable and stymie human progress. Fertile croplands in Nigeria and volcanic soils in the Great Rift Valley feed hundreds of millions. But deserts, malarial lowlands, poor soils, and unreliable rains limit where people can live, forcing increasing numbers to compete for finite resources.

The strain is palpable, with continuing conflicts and poverty on the rise along with population. Africa is expected to grow from 900 million people to two billion by 2050. How they survive and prosper will hinge on the actions not just of governments but of communities and visionary individuals. "The solutions to our problems lie within us," says Wangari Maathai, whose work to reforest Kenya by planting 30 million trees earned her the Nobel Peace Prize. "No matter what problems we face, we can still protect the environment and think of future generations."

Here is a portrait of that environment showing Africa's natural landscapes, and where they converge with humanity.

How the Land Unfolds

From the first cautious steps in the Great Rift Valley, humans have adapted to the challenges of Africa. Today it lies divided into more nations than any other continent—47 on the mainland and six offshore. But as shown by this satellite-derived map, landscapes that ignore national borders form a mosaic of ecosystems that subtly blend one into the other—from the temperate Mediterranean through desert and scattered croplands to forest, swamp, and savanna—each with its own rules for life. A vertical strip of the continent, from central Egypt to South Africa's coast (below), is a key to explore Africa's varied face.

DESERT EXPANSE

Sand, bedrock, and stone cover one-third of Africa with land that is scarcely habitable. Winds blowing across open sand create dunes up to 400 meters high in Niger's Ténéré desert. Bedrock outcrops (dark shading) such as Chad's Tibesti Mountains punctuate the Sahara, separated by dry, stony plains (pink shading). During cyclical droughts the Sahara spreads south, but rains in recent years have greened the desert's southern fringes.

BREADBASKETS

Land used for raising food in Africa has increased by an estimated 75 percent since the mid-1960s. A band stretching from Senegal to Ethiopia then south to Johannesburg supports the most intensive agriculture and some of the densest populations in Africa's history. Depending on rain, a third to a half of this area is sown with crops or planted for pasture, with women producing more than 70 percent of the food. To maintain soil fertility and spread their risks, farmers diversify what and where they plant. Most rely on corn, a high-yield, fast-growing crop that's feeding increasing numbers of people.

DENSE FORESTS

Africa's only unbroken rain forest covers the central Congo Basin, home to large concentrations of wildlife including forest elephants and lowland gorillas. Throughout West Africa, logging, farming, and hunting have reduced forest canopy and wiped out most large animals. In Ghana, for instance, cacao plantations now surround small patches of protected but heavily poached rain forest. Islands of mountain forest (at or above a thousand meters) in Ethiopia, East Africa, and coastal central Africa secure soil on steep slopes and shelter many species found nowhere else. Forests are falling here as elsewhere across Africa, but estimates of deforestation vary widely.

WOODLANDS AND SHRUBLANDS

Moving from the wet tropics toward deserts, thick stands of tall trees give way to spindly trees, then to squat ones like acacia, and finally to tough shrubs. Human-set fires clear brush and bring fresh growth of grass. This creates open areas, where farmers clash with rebounding populations of elephants that tread on crops. South of the Sahel, woodlands become grasslands as people cut trees for fuel faster than they can regrow.

GRASSLANDS

When Africa's grasslands turn green with seasonal rains, wildebeests and other ungulates churn the earth as they migrate en masse toward new growth. Herders also follow the rains, taking livestock to newly lush pastures. In the dry season they feed and water cattle in huge, grassy wetlands such as Mali's Inland Niger Delta, the Lake Chad region, Sudan's Sudd, and Botswana's Okavango Delta.

CROWDED SPACES

Orange and red shading—based on nighttime lights, proximity to roads, and other factors—show the thickest concentrations of people. Humans pack areas of ample rain and rich soil where farmers can raise the most food: Nigeria, Ethiopia, and countries bordering the lakes of the Great Rift Valley. Drawn by economic opportunity, Africans also are flooding into cities like Lagos, Nairobi, and Johannesburg. Africa's cities are growing faster than those on any other continent.

High population density (people per square kilometer)
More than 250
100 to 250

Atlas Mountains
Stretching for 2,400 kilometers, Africa's longest mountain range has plentiful springs that help people at lower elevations survive droughts. Towns tap the springs for pure water, and farmers divert streams for irrigation.

World's Largest Desert
At nine million square kilometers, the Sahara confines North Africans to fertile strips along the Mediterranean and Nile River. In Egypt, the government is pumping water west from Lake Nasser to form new lakes, which will irrigate farmland in the desert.

Farming Success
Small farms around Kano, Nigeria, grow enough to feed an increasingly dense population. Farmers use ox-drawn plows instead of hoes to more efficiently turn soil. Lacking land for grazing, they fatten penned livestock with weeds and crop stalks, collecting manure for fertilizer.

Western Sudan
Herders and farmers once cooperated across the Sahel, but drought and rising populations now fuel competition for land. Sudan's government has deliberately exploited such tensions to incite mass murders in Darfur, heart of a complex political crisis that has left some 200,000 people dead and more than two million displaced.

Mountains of Ethiopia
Some 85 percent of Ethiopians live in fertile highlands, a refuge from malaria. But farmers have few resources, and because the government owns all the land, they have little incentive to care for the soil. Yields are falling as the population rises by two million a year.

When People Create Forest
Trees are thinning in much of West Africa, but humans also preserve and create forests. When villagers clear away grass they produce firebreaks that stop savanna blazes from burning trees. Waste dumped outside villages becomes compost, and people plant trees like oil palms and mangoes.

Nigeria's Oil Country
The Niger Delta holds sub-Saharan Africa's largest oil deposits. Though exports net billions, frequent spills pollute fisheries, a vital source of food.

World's Largest Swamp Forest
Branching from rivers in the Congo Basin, this 12-million-hectare area is largely wilderness. South along the Congo River lie sparsely populated grasslands, rooted in ancient dunes formed by sand blown from the Kalahari Desert.

Spectacle of the Serengeti
Spread below Kilimanjaro—Africa's highest peak—the Serengeti and its lions, giraffes, and roaming herds lure people to Tanzania. Tourism brings in 730 million dollars a year, nearly a fifth of GDP. The government hopes to boost visitor numbers while protecting the land.

Africa's Green Heart
At two million square kilometers, Congo Basin holds the world's second biggest rain forest—still largely intact due to selective logging. But farms southeast of Bangui and along logging roads north of Bumba are pushing into the trees.

Making Every Inch Count
Rwandans get big harvests from small plots, terracing hills to feed Africa's most densely settled mainland nation. As families grow, farms are split into tiny parcels. Hungry for land, people plant on steep slopes and overcultivate, causing soil erosion and depletion.

West Zambezi Floodplain
Floods, sandy soils, and flies carrying disease make this a hard place to live. The Lozi people have adapted, building villages on high mounds and moving livestock during wet-season floods.

Angola Reborn
Peace in Angola in 2002 led to renewed attention to wildlife conservation. Feared extinct, the giant sable antelope, a national symbol, has been rediscovered in northern woodlands.

Great Rift Valley
From Ethiopia to Mozambique, this series of faults holds three of the world's ten largest lakes. The fish-rich waters provide food, as do volcanic soils laid down by ancient eruptions.

Saving Madagascar
The world's fourth largest island shelters thousands of endemic species. Since 1950 more than half its trees have fallen to loggers and plantations. Now the government plans to triple protected area by 2008, preserving habitat and critical watersheds.

Drying Up?
Malawi farmers rely on corn, a crop sensitive to drought, now plaguing the region. Amid fears that global warming may further cut rainfall, scientists are developing corn that needs less water.

Places of Promise
Cities house two out of three South Africans, who move to urban areas seeking jobs. There's little to keep them in the countryside, where fields are eroded and soils depleted because colonial-era policies confined black farmers to designated homelands.

CAPE VERDE — AFRICA — SEYCHELLES — MAURITIUS

WORLDS APART

Africa's three most distant offshore nations display extremes of survival. Heavily deforested, Mauritius is a textile exporter with per capita GDP equal to $12,800, the highest in Africa. Beaches on some of the 115 Seychelles lure tourist dollars. Arid and overgrazed, Cape Verde depends on money sent home by citizens overseas, more of whom live abroad than on the islands themselves.

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KILOMETERS 0 125 250 375 500

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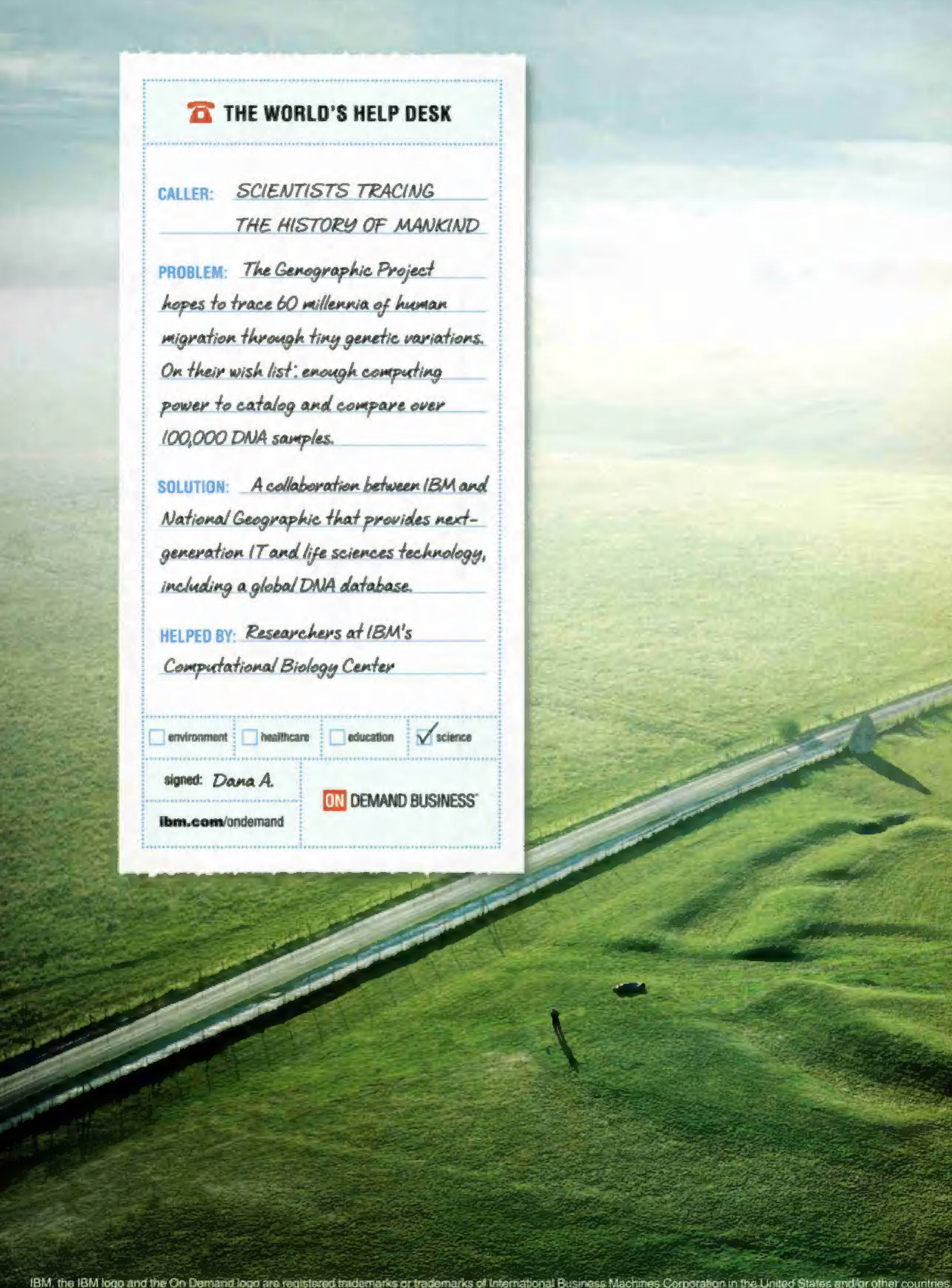

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GlaxoSmithKline strengthens community groups battling the disease at the frontlines

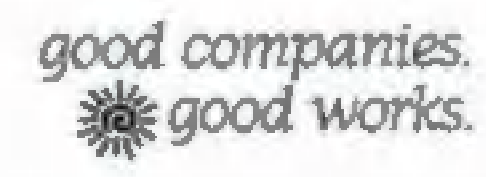
"Positive Action funding has brought us new opportunities to improve the lives of people living with HIV and AIDS on the frontlines." Jacqueline Muka, Executive Director, Centre for African Family Studies

Staggering Statistics

Since the AIDS epidemic began 20 years ago, over 28 million people have died and an estimated 42 million are living with HIV today. Although antiretroviral medicines have dramatically extended life for some, there is still no cure, no vaccine, and no short cut to accessing effective healthcare for the millions affected who live with poverty, stigma, and little care or support.

Positive Action

GlaxoSmithKline (GSK) recognized early that community involvement was crucial to controlling the epidemic. Since 1992, GSK's Positive Action program has supported affected communities around the world to raise awareness of HIV and AIDS, increase prevention efforts, confront stigma and discrimination, and connect more people with HIV/AIDS services. More than 8,000 volunteer health and social care workers from hundreds of African organizations have been trained to reach out, educate, and improve the care for people with AIDS in the poorest communities.



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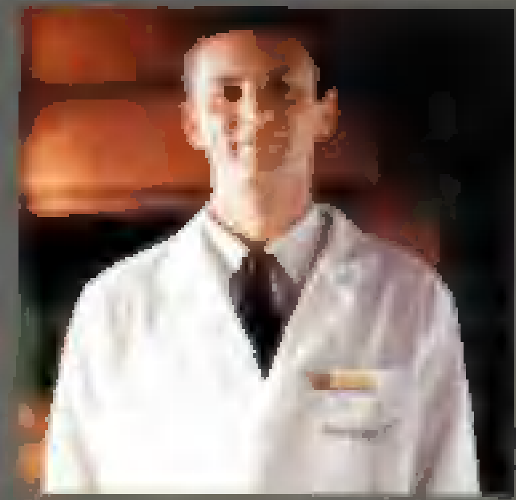

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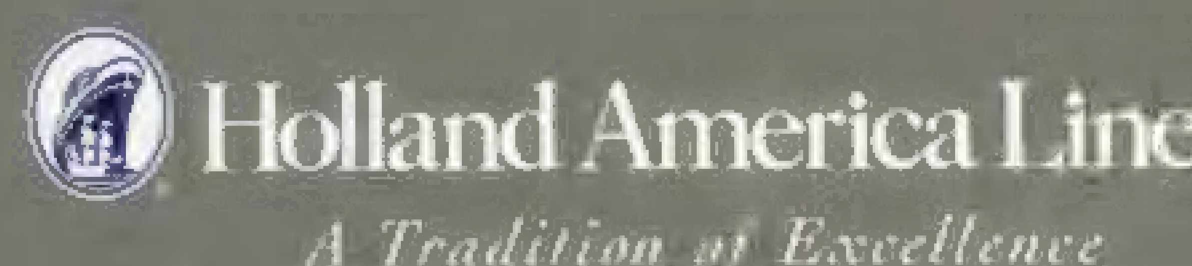

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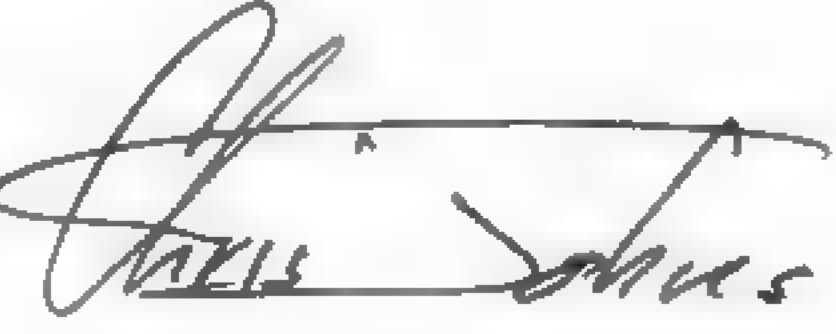
From the Editor

A bridge can join two sides of a river—

and sometimes even link the humanity and compassion of one man with the lives of his fellow citizens.

The bridge I once photographed in Zambia is special because it tells a story of hope and belief. It's a bridge built by the sheer will and persistence of a single man, Brother Crispin Valeri. In 1971 five people died while crossing the Zambezi River in a dugout canoe en route to Chinyingi Mission. When he heard the news, Brother Crispin, who worked at the mission, vowed to prevent further deaths by building a pedestrian bridge. He had few resources and no experience in building anything remotely resembling a bridge. But he started poring over books on engineering, scavenging discarded cable from Zambian mines, and enlisting local help. In five years it was ready: a 1,000-foot-long suspension bridge that is a work of art—and a lifesaver.

My hope and belief is that Africa can be a model for the world in finding a balance between the needs of people and the needs of wild places. Sound far-fetched? No more so than that impossible bridge across the Zambezi.



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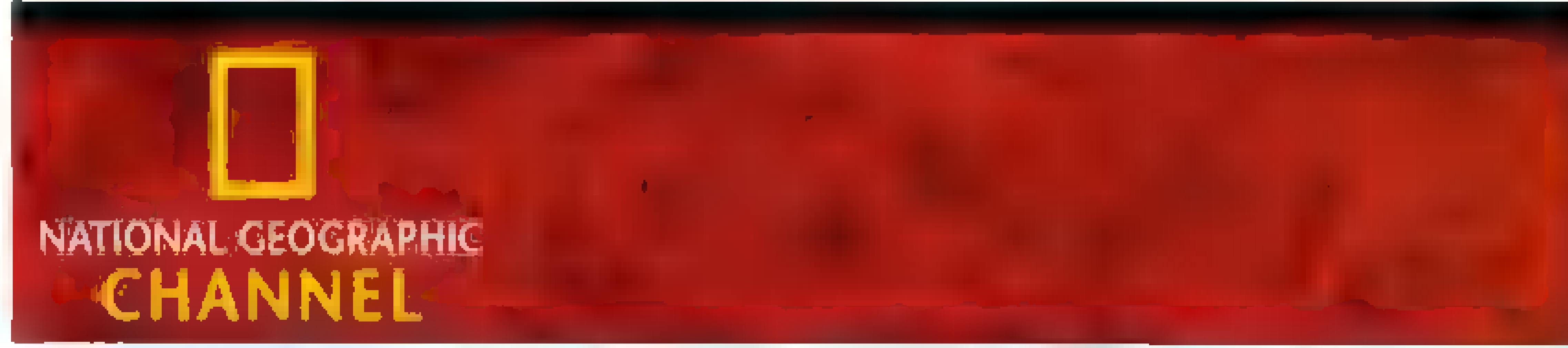

THURSDAY, SEPTEMBER 22, 8 P.M. ET/PT

Megaflyover

"Not an elephant, hyena, or lion could wake me after eight hours in the air," says biologist Mike Fay (above). Follow his path on one of conservation's most ambitious journeys, a flight of more than 70,000 miles over Africa's last wild places, captured in a new documentary airing on the National Geographic Channel. On board their red Cessna, Fay and chief pilot Peter Ragg risk their lives—and sanity—to search for animal populations and map humanity's imprint on tropical forests, savannas, and deserts. Along the way they suffer from malaria, overcome sandstorms and brush fires, and struggle to keep their equipment running, all in the name of preserving what remains of Africa's wilderness.

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PHOTO BY PETER RAGG

James Rowland, 7:11 am, Fresno, California

Paisley over polka dots.

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Behind the Scenes

WildCam, a live video feed from Botswana's Mashatu Game Reserve, will put zebras and other wildlife on view.

The Society Looks at Africa

This month the National Geographic Society celebrates Africa in words, photographs, film, lectures, exhibits, and on the Web.

■ **WILDCAM** During the dry season at Botswana's Mashatu Game Reserve, elephants, lions, zebras, and giraffes converge at a place called Pete's Pond. This fall the animals will have another companion—a remotely operated video camera. Go to *ngm.com/wildcamafrica* to see round-the-clock streaming video and learn more about the animals of southern Africa.

■ **ROAR: LIONS OF THE KALAHARI** Travel deep into Botswana's Kalahari Desert with filmmaker Tim Liversedge. During 18 months of filming, he captured the drama of two rival lions as they battled for territory. This large-format film is now playing on giant screens worldwide. See a complete list of theaters at *destinationcinema.com/our_films/roar/now_playing.asp.*

■ **THROUGH THE EYES OF THE GODS: AN AERIAL VISION OF AFRICA** When Robert B. Haas pointed a camera down from his plane, Africa revealed itself to him in images from sand dunes to surging herds of wildlife, from a market's scatter of produce to a spreading coral reef. The book includes excerpts from Haas's travel journal and an introduction by *I Dream of Africa* author Kuki Gallmann.

■ **THE LAST PLACE ON EARTH** Michael Nichols spent 12 years photographing central Africa. Now that work is presented in a two-volume set supported in part by the Wildlife Conservation Society. The first book showcases Nichols's photography; the second features the journals of biologist Mike Fay along with Nichols's images from Fay's 2,000-mile walk across Africa, the Megatransect. Proceeds from this boxed set go to conservation projects in the Congo Basin.

■ **EXPERIENCE AFRICA IN NEW YORK CITY** See an exhibit of large-format images of Africa from GEOGRAPHIC photographers, and watch WildCam's live video feed from Botswana at Grand Central Terminal's Vanderbilt Hall, September 6-10.

Haas's book gives a sky-high view of Africa.

This boxed set covers Nichols's African work.

Calendar

AUGUST

15 "Africa Megaflyover" exhibit opens. Learn about biologist Mike Fay's aerial survey of Africa, and see images from the epic journey. National Geographic, Washington, D.C. To see Fay's travel journals go to *ngm.com/megaflyover.*

21, 22 *Inside 9/11* on the National Geographic Channel. Investigate the events that unfolded before, during, and after the fateful day.

SEPTEMBER

14 *The Last Best Chance* film screening and panel discussion. Watch this drama about the threat of nuclear terrorism, then hear a panel discussion on weapons of mass destruction with author Richard Rhodes and former U.S. Senator Sam Nunn. National Geographic, Washington, D.C.

14 Africa Discussion Editor in Chief Chris Johns interviews Kenyan Nobel laureate Wangari Maathai about links between the environment, democracy, and peace. 92nd Street Y, New York City. For tickets call 212-415-5500 or go to *92Y.org.*

22-25 All Roads Film Festival Enjoy work by indigenous and minority-culture filmmakers, photographers, and artists. Egyptian Theatre, Los Angeles.

23 "Through the Eyes of the Gods" exhibit opens. See Robert B. Haas's aerial images of Africa at the African American Museum in Dallas, Texas.

Calendar dates are accurate at press time; please go to *nationalgeographic.com* or call 1-800-NGS-LINE (647-5463) for more information.

ROGER DE LA HARPE, AFRICA IMAGERY

When it comes to bad cholesterol–

Ask your doctor if lower is better.

Getting high cholesterol down is important.

Doctors know lowering high cholesterol is important for everyone. But for some people, it's even more important. In fact, a panel of medical experts recently proposed updated guidelines suggesting many patients aim for an even lower cholesterol goal than before.*

Working with your doctor is key to helping you reach your cholesterol goal.

If, after all you've tried—including diet and exercise—your doctor believes you need to get your bad cholesterol even lower, ask whether CRESTOR might help.

Aim lower.

CRESTOR may make the difference you need. In fact, the 10-mg dose of CRESTOR, along with diet, can lower bad cholesterol by as much as 52% (vs 7% with placebo). That means your LDL-C—the bad cholesterol—could go down about half. Your results may vary.

Is CRESTOR right for you?

That's another conversation you need to have with your doctor. Your doctor will decide the best course of treatment for you after assessing your particular needs.

Get more information about CRESTOR.

To learn more about CRESTOR, or if you are without prescription coverage and can't afford your medication, AstraZeneca may be able to help. Call 800-CRESTOR or visit CRESTOR.com.

Here is important safety information about CRESTOR you need to know.

CRESTOR is prescribed along with diet for lowering high cholesterol and has not been determined to prevent heart disease, heart attacks, or strokes. CRESTOR is not right for everyone, including women who are nursing, pregnant, or who may become pregnant, or anyone with liver problems. Your doctor will do blood tests before and during treatment with CRESTOR to monitor your liver function. Unexplained muscle pain and weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. The 40-mg dose of CRESTOR is only for patients who do not reach goal on 20 mg. Be sure to tell your doctor if you are taking any medications. Side effects occur infrequently and include muscle aches, constipation, weakness, abdominal pain, and nausea. They are usually mild and tend to go away.

If your doctor says, "lower is better," aim lower with CRESTOR.

*Adult Treatment Panel (ATP) III, Update, 2004

Please read the important Product Information about CRESTOR on the adjacent page and discuss it with your doctor.

AstraZeneca

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Please read this summary carefully and then ask your doctor about CRESTOR. [illegible] advertisement can provide all the information needed to determine if a drug is right for you. This advertisement does not take the place of careful discussions with your doctor. Only your doctor has the training to weigh the risks and benefits of a prescription drug.

BRIEF SUMMARY: For full Prescribing Information, see package insert. **INDICATIONS AND USAGE** CRESTOR is indicated: 1. as an adjunct to diet to reduce elevated total-C, LDL-C, ApoB, nonHDL-C, and TG levels and to increase HDL-C in patients with primary hypercholesterolemia (heterozygous familial and nonfamilial) and mixed dyslipidemia (Fredrickson Type IIa and IIb); 2. as an adjunct to diet for the treatment [illegible] patients with elevated serum TG levels (Fredrickson Type IV); 3. to reduce LDL-C, total-C, and ApoB in patients with homozygous familial hypercholesterolemia as an adjunct to other lipid-lowering treatments (e.g., LDL apheresis) or if such treatments are unavailable. **CONTRAINDICATIONS** CRESTOR is contraindicated in patients with a known hypersensitivity to any component of this product. Rosuvastatin is contraindicated in patients with active liver disease or with unexplained persistent elevations of serum transaminases (see WARNINGS, Liver Enzymes). **Pregnancy and Lactation** Atherosclerosis [illegible] a chronic process and discontinuation [illegible] lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. ROSUVASTATIN SHOULD BE ADMINISTERED TO WOMEN [illegible] CHILDBEARING AGE ONLY WHEN SUCH PATIENTS ARE HIGHLY UNLIKELY TO CONCEIVE AND HAVE BEEN INFORMED OF THE POTENTIAL HAZARDS. If the patient becomes pregnant while taking this drug, therapy should be discontinued immediately and the patient apprised of the potential hazard [illegible] the fetus. **WARNINGS Liver Enzymes** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. The incidence of persistent elevations (>3 times the upper limit of normal [ULN] occurring [illegible] 2 or more consecutive occasions) in serum transaminases in fixed dose studies was 0.4, 0, 0, and 0.1% in patients who received rosuvastatin 5, 10, 20, and 40 mg, respectively. [illegible] most cases, the elevations were transient and resolved or improved [illegible] continued therapy or after a brief interruption in therapy. There were two cases of jaundice, for which a relationship to rosuvastatin therapy could not be determined, which resolved after discontinuation of therapy. There were [illegible] cases of liver failure or irreversible liver disease in these trials. **It is recommended that liver function tests be performed before and at 12 weeks following both the initiation of therapy and any elevation of dose, and periodically (e.g., semiannually) thereafter.** Liver enzyme changes generally occur in the first 3 months of treatment with rosuvastatin. Patients who develop increased transaminase levels should [illegible] monitored until the abnormalities have resolved. Should an increase in ALT [illegible] AST of >3 times ULN persist, reduction of dose or withdrawal of rosuvastatin is recommended. Rosuvastatin should be used with caution in patients who consume substantial quantities of alcohol and/or have a history of liver disease (see CLINICAL PHARMACOLOGY, Special Populations, Hepatic Insufficiency). Active liver disease or unexplained persistent transaminase elevations are contraindications to the use [illegible] rosuvastatin (see CONTRAINDICATIONS). **Myopathy/Rhabdomyolysis** **Rare cases of rhabdomyolysis with acute renal failure secondary to myoglobinuria have been reported with rosuvastatin and with other drugs in this class.** Uncomplicated myalgia has been reported in rosuvastatin-treated patients (see ADVERSE REACTIONS). Creatine kinase (CK) elevations (>10 times upper limit of normal) occurred in 0.2% to 0.4% of patients taking rosuvastatin at doses up to 40 mg in clinical studies. Treatment-related myopathy, defined as muscle aches or muscle weakness [illegible] conjunction with increases in CK values >10 times upper limit of normal, was reported in up to 0.1% of patients taking rosuvastatin doses of up to 40 mg in clinical studies. In clinical trials, [illegible] incidence of myopathy and rhabdomyolysis increased at doses of rosuvastatin above the recommended dosage range (5 to 40 mg). In postmarketing experience, effects on skeletal muscle, e.g. uncomplicated myalgia, myopathy and, rarely, rhabdomyolysis have been reported in patients treated with HMG-CoA reductase inhibitors including rosuvastatin. As with other HMG-CoA reductase inhibitors, reports of rhabdomyolysis with rosuvastatin are rare, but higher at the highest marketed dose (40 mg). Factors that may predispose patients to myopathy with HMG-CoA reductase inhibitors include advanced age (≥65 years), hypothyroidism, and renal insufficiency. Consequently: 1. Rosuvastatin should be prescribed with caution in patients with predisposing factors for myopathy, such as, renal impairment (see DOSAGE AND ADMINISTRATION), advanced age, and inadequately treated hypothyroidism. 2. Patients should be advised to promptly report unexplained muscle pain, tenderness, or weakness, particularly if accompanied by malaise or fever. Rosuvastatin therapy should be discontinued if markedly elevated [illegible] levels occur or myopathy is diagnosed or suspected. 3. The 40 mg dose [illegible] rosuvastatin is reserved only for those patients who have not achieved their LDL-C goal utilizing the [illegible] mg dose of rosuvastatin once daily (see DOSAGE AND ADMINISTRATION). 4. The risk of myopathy during treatment with rosuvastatin may be increased with concurrent administration of other lipid-lowering therapies or cyclosporine (see CLINICAL PHARMACOLOGY, Drug Interactions, PRECAUTIONS, Drug Interactions, and DOSAGE AND ADMINISTRATION). **The benefit of further alterations in lipid levels by the combined use of rosuvastatin with fibrates or niacin should be carefully weighed against the potential risks of this combination. Combination therapy with rosuvastatin and gemfibrozil should generally be avoided. (See DOSAGE AND ADMINISTRATION and PRECAUTIONS, Drug Interactions).** 5. **The risk of myopathy during treatment with rosuvastatin may be increased in circumstances which increase rosuvastatin drug levels (see CLINICAL PHARMACOLOGY, Special Populations, Race and Renal Insufficiency, and PRECAUTIONS, General).** 6. **Rosuvastatin therapy should also be temporarily withheld in any patient with an acute, serious condition suggestive of myopathy [illegible] predisposing to the development of renal failure secondary to rhabdomyolysis (e.g., sepsis, hypotension, dehydration, major surgery, trauma, severe metabolic, endocrine, and electrolyte disorders, or uncontrolled seizures).** **PRECAUTIONS General** Before instituting therapy with rosuvastatin, an attempt should [illegible] made to control hypercholesterolemia with appropriate diet and exercise, weight reduction in obese patients, and treatment of underlying medical problems (see INDICATIONS AND USAGE). Administration of rosuvastatin 20 mg to patients with severe renal impairment (CL_{cr} <30 mL/min/1.73 m^2) resulted in a 3-fold increase in plasma concentrations of rosuvastatin compared with healthy volunteers (see WARNINGS, Myopathy/Rhabdomyolysis and DOSAGE AND ADMINISTRATION). The result of a large pharmacokinetic study conducted in the US demonstrated an approximate 2-fold elevation in median exposure in Asian subjects (having either Filipino, Chinese, Japanese, Korean, Vietnamese or Asian-Indian origin) compared with a Caucasian control group. This increase should be considered when making rosuvastatin dosing decisions for Asian patients. (See WARNINGS, Myopathy/Rhabdomyolysis; CLINICAL PHARMACOLOGY, Special Populations, Race; and DOSAGE AND ADMINISTRATION.) **Information for Patients** Patients should [illegible] advised to report promptly unexplained muscle pain, tenderness, or weakness, particularly if accompanied by malaise or fever. When taking rosuvastatin with an aluminum and magnesium hydroxide combination antacid, the antacid should be taken at least 2 hours after rosuvastatin administration (see CLINICAL PHARMACOLOGY, Drug Interactions). **Laboratory Tests** In the rosuvastatin clinical trial program, dipstick-positive proteinuria and microscopic hematuria were observed among rosuvastatin-treated patients, predominantly in patients dosed above the recommended dose range (i.e., 80 mg). However, this finding was more frequent in patients taking rosuvastatin 40 [illegible] when compared to lower doses of rosuvastatin or comparator statins, though it was generally transient and was not associated with worsening renal function. Although the clin[illegible] significance of this finding is unknown, a dose reduction should [illegible] considered for patients on rosuvastatin 40 mg therapy with unexplained persistent proteinuria during routine urinalysis testing. **Drug Interactions Cyclosporine:** When rosuvastatin 10 mg was coadministered with cyclosporine in cardiac transplant patients, rosuvastatin mean C_{max} and mean AUC were increased 11-fold and 7-fold, respectively, compared with healthy volunteers. These increases are considered [illegible] be clinically significant and require special consideration in the dosing of rosuvastatin to patients taking concomitant cyclosporine (see WARNINGS, Myopathy/Rhabdomyolysis, and DOSAGE AND ADMINISTRATION). **Warfarin:** Coadministration of rosuvastatin to patients [illegible] stable warfarin therapy resulted in clinically significant rises in INR (>4, baseline 2-3). In patients taking coumarin anticoagulants and rosuvastatin concomitantly, INR should be determined before starting rosuvastatin and frequently enough during early therapy to ensure that no significant alteration of INR occurs. Once a stable INR time has been documented, INR can be monitored at the intervals usually recommended for patients on coumarin anticoagulants. If the dose of rosuvastatin is changed, the same procedure should be repeated. Rosuvastatin therapy has not been associated with bleeding or with changes in INR in patients not taking anticoagulants. **Gemfibrozil:** Coadministration of a single rosuvastatin dose to healthy volunteers [illegible] gemfibrozil (600 [illegible] twice daily) resulted in a 2.2- and 1.9-fold, respectively, increase in mean C_{max} and mean AUC of rosuvastatin (see DOSAGE AND ADMINISTRATION). **Endocrine Function** Although clinical studies have shown that rosuvastatin alone does not reduce basal plasma cortisol concentration or impair adrenal reserve, caution should be exercised if any HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered concomitantly with drugs that may decrease the levels or activity of endogenous steroid hormones such as ketoconazole, spironolactone, and cimetidine. **CNS Toxicity** CNS vascular lesions, characterized by perivascular hemorrhages, edema, and mononuclear cell infiltration [illegible] perivascular spaces, have been observed [illegible] dogs treated with several other members of this drug class. A chemically similar drug in this class produced dose-dependent optic nerve degeneration (Wallerian degeneration [illegible] retinogeniculate fibers) in dogs, at a dose that produced plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose. Edema, hemorrhage, and partial necrosis [illegible] the interstitium of the choroid plexus was observed in a female dog sacrificed moribund at day 24 at [illegible] mg/kg/day by oral gavage (systemic exposures 100 times the human exposure at 40 mg/day based on AUC comparisons). Corneal opacity was seen in dogs treated for 52 weeks at 6 mg/kg/day [illegible] oral gavage (systemic exposures [illegible] times the human exposure at 40 mg/day based on AUC comparisons). Cataracts were seen in dogs treated for 12 weeks by oral gavage at 30 mg/kg/day (systemic exposures 60 times the human exposure at 40 mg/day based [illegible] AUC comparisons). Retinal dysplasia and retinal loss were seen [illegible] dogs treated for 4 weeks by oral gavage at 90 mg/kg/day (systemic exposures 100 times the human exposure at 40 mg/day based on AUC). Doses ≤30 mg/kg/day (systemic exposures ≤60 times the human exposure at 40 mg/day based [illegible] AUC comparisons) following treatment up [illegible] one year [illegible] not reveal retinal findings. **Carcinogenesis, Mutagenesis, Impairment of Fertility** In a 104-week carcinogenicity study in rats at dose levels of 2, 20, 60, or 80 mg/kg/day by oral gavage, the incidence of uterine stromal polyps was significantly increased [illegible] females at [illegible] mg/kg/day at systemic exposure [illegible] times the human exposure at 40 mg/day based on AUC. Increased incidence of polyps was not seen at lower doses. In a 107-week carcinogenicity study in mice given 10, 60, 200 mg/kg/day by oral gavage, an increased incidence of hepatocellular adenoma/carcinoma was observed at 200 mg/kg/day at systemic exposures [illegible] times human exposure at 40 mg/day based [illegible] AUC. An increased incidence of hepatocellular tumors was not seen at lower doses. Rosuvastatin was not mutagenic or clastogenic with or without metabolic activation [illegible] the Ames test with *Salmonella typhimurium* and *Escherichia coli*, the mouse lymphoma assay, and the chromosomal aberration assay in Chinese hamster lung cells. Rosuvastatin was negative in the *in vivo* mouse micronucleus test. [illegible] rat fertility studies with oral gavage doses of 5, 15, [illegible] mg/kg/day, males were treated for 9 weeks prior to and throughout mating and females were treated 2 weeks prior to mating and throughout mating until gestation day 7. [illegible] adverse effect on fertility was observed at 50 mg/kg/day (systemic exposures up to 10 times human exposure at 40 mg/day based on AUC comparisons). In testicles of dogs treated with rosuvastatin at 30 mg/kg/day for one month, spermatidic giant cells were seen. Spermatidic giant cells were observed in monkeys after 6-month treatment at 30 mg/kg/day in addition to vacuolation of seminiferous tubular epithelium. Exposures in the dog were [illegible] times and in the monkey 10 times human exposure at 40 mg/day based on body surface area comparisons. Similar findings have been seen with other drugs in this class. **Pregnancy** ***Pregnancy Category X*** See CONTRAINDICATIONS. Rosuvastatin may cause fetal harm when administered to a pregnant woman. Rosuvastatin is contraindicated in women who are [illegible] may become pregnant. Safety in pregnant women has not been established. There are [illegible] adequate and well-controlled studies of rosuvastatin in pregnant women. Rosuvastatin crosses the placenta and is found in fetal tissue and amniotic fluid at 3% and 20%, respectively, of the maternal plasma concentration following a single [illegible] mg/kg oral gavage dose [illegible] gestation day 16 in rats. A higher fetal tissue distribution (25% maternal plasma concentration) was observed [illegible] rabbits after a single oral gavage dose of 1 mg/kg on gestation day [illegible]. If this drug is administered to a woman with reproductive potential, the patient should be apprised of the potential hazard to a fetus. In female rats given oral gavage doses of 5, 15, 50 mg/kg/day rosuvastatin before mating and continuing through day 7 postcoitus results in decreased fetal body weight (female pups) and delayed ossification [illegible] the high dose (systemic exposures 10 times human exposure at 40 mg/day based on AUC comparisons). In pregnant rats given oral gavage doses of 2, 20, 50 mg/kg/day from gestation day 7 through lactation day 21 (weaning), decreased pup survival occurred in groups given 50 mg/kg/day, systemic exposures ≥12 times human exposure at 40 mg/day based on body surface area comparisons. In pregnant rabbits given oral gavage doses of 0.3, 1, 3 mg/kg/day from gestation day 6 to lactation day 18 (weaning), exposures equivalent to human exposure at 40 mg/day based on body surface area comparisons, decreased fetal viability and maternal mortality was observed. Rosuvastatin was not teratogenic in rats at ≤25 mg/kg/day or in rabbits ≤3 mg/kg/day (systemic exposures equivalent to human exposure at 40 mg/day based on AUC or body surface comparison, respectively). **Nursing Mothers** It is not known whether rosuvastatin [illegible] excreted in human milk. Studies in lactating rats have demonstrated that rosuvastatin [illegible] secreted into breast milk at levels 3 times higher than that obtained in the plasma following oral gavage dosing. Because many drugs are excreted [illegible] human milk and because of the potential for serious adverse reactions in nursing infants from rosuvastatin, a decision should be made whether to discontinue nursing or administration of rosuvastatin taking into account the importance of the drug to the lactating woman. **Pediatric Use** The safety and effectiveness in pediatric patients have not been established. Treatment experience with rosuvastatin [illegible] a pediatric population [illegible] limited to 8 patients with homozygous FH. None of these patients was below 8 years of age. **Geriatric Use** Of the 10,275 patients in clinical studies with rosuvastatin, 3,159 (31%) were 65 years and older, and 698 (6.8%) were 75 years and older. The overall frequency of adverse events and types of adverse events were similar [illegible] patients above and below 65 years of age. (See WARNINGS, Myopathy/Rhabdomyolysis.) The efficacy of rosuvastatin in the geriatric population (≥65 years of age) was comparable to the efficacy observed [illegible] the non-elderly. **ADVERSE REACTIONS** Rosuvastatin is generally well tolerated. Adverse reactions have usually been mild and transient. In clinical studies of 10,275 patients, 3.7% were discontinued due to adverse experiences attributable to rosuvastatin. The most frequent adverse events thought to be related to rosuvastatin were myalgia, constipation, asthenia, abdominal pain, and nausea. **Clinical Adverse Experiences** Adverse experiences, regardless of causality assessment, reported in ≥2% of patients in placebo-controlled clinical studies of rosuvastatin are shown in Table 1; discontinuations due to adverse events in these studies of up to 12 weeks duration occurred in 3% of patients on rosuvastatin and 5% [illegible] placebo.

CRESTOR® (rosuvastatin calcium) Tablets

Table 1. Adverse Events in Placebo-Controlled Studies

Adverse event	Rosuvastatin N=744	Placebo N=382
Pharyngitis	9.0	7.6
Headache	5.5	5.0
Diarrhea	3.4	2.9
Dyspepsia	3.4	3.1
Nausea	3.4	3.1
Myalgia	2.8	1.3
Asthenia	2.7	2.6
Back pain	2.6	2.4
Flu syndrome	2.3	1.8
Urinary tract infection	2.3	1.6
Rhinitis	2.2	2.1
Sinusitis	2.0	1.8

In addition, the following adverse events were reported, regardless of causality assessment, [illegible] ≥1% of 10,275 patients treated with rosuvastatin in clinical studies. The events [illegible] *italics* occurred in ≥2% [illegible] these patients. **Body as a Whole:** *Abdominal pain, accidental injury, chest pain, infection, pain,* pelvic pain, and neck pain. **Cardiovascular System:** *Hypertension*, angina pectoris, vasodilatation, and palpitation. **Digestive System:** *Constipation, gastroenteritis*, vomiting, flatulence, periodontal abscess, and gastritis. **Endocrine:** Diabetes mellitus. **Hemic and Lymphatic System:** Anemia and ecchymosis. **Metabolic and Nutritional Disorders:** *Peripheral edema*. **Musculoskeletal System:** *Arthritis, arthralgia,* and pathological fracture. **Nervous System:** *Dizziness, insomnia, hypertonia, paresthesia, depression*, anxiety, vertigo, and neuralgia. **Respiratory System:** *Bronchitis, cough increased*, dyspnea, pneumonia, and asthma. **Skin and Appendages:** *Rash* and pruritus. **Laboratory Abnormalities:** In the rosuvastatin clinical trial program, dipstick-positive proteinuria and microscopic hematuria were observed among rosuvastatin-treated patients, predominantly in patients dosed above the recommended dose range (i.e., 80 mg). However, this finding was more frequent in patients taking rosuvastatin 40 mg, when compared [illegible] lower doses [illegible] rosuvastatin [illegible] comparator statins, though it was generally transient and was not associated with worsening renal function. (See PRECAUTIONS, Laboratory Tests.) Other abnormal laboratory values reported were elevated creatinine phosphokinase, transaminases, hyperglycemia, glutamyl transpeptidase, alkaline phosphatase, bilirubin, and thyroid function abnormalities. Other adverse events reported less frequently than 1% in the rosuvastatin clinical study program, regardless [illegible] causality assessment, included arrhythmia, hepatitis, hypersensitivity reactions (i.e., face edema, thrombocytopenia, leukopenia, vesiculobullous rash, urticaria, and angioedema), kidney failure, syncope, myasthenia, myositis, pancreatitis, photosensitivity reaction, myopathy, and rhabdomyolysis. **Postmarketing Experience** In addition to the events reported above, as with other drugs in this class, [illegible] following event has been reported during post-marketing experience with CRESTOR, regardless [illegible] causality assessment: very rare cases of jaundice. **OVERDOSAGE** There [illegible] no specific treatment in the event of overdose. In the event of overdose, the patient should be treated symptomatically and supportive measures instituted as required. Hemodialysis does not significantly enhance clearance [illegible] rosuvastatin. **DOSAGE AND ADMINISTRATION** The patient should be placed [illegible] a standard cholesterol-lowering diet before receiving CRESTOR and should continue on this diet during treatment. CRESTOR can be administered as a single dose at any time [illegible] day, with or without food. **Hypercholesterolemia (Heterozygous Familial and Nonfamilial) and Mixed Dyslipidemia (Fredrickson Type IIa and IIb)** The dose range for CRESTOR is 5 to [illegible] mg once daily. Therapy with CRESTOR should [illegible] individualized according [illegible] goal of therapy and response. The usual recommended starting dose of CRESTOR is [illegible] mg once daily. However, initiation of therapy with 5 mg once daily should be considered for patients requiring less aggressive LDL-C reductions, who have predisposing factors for myopathy, and as noted below for special populations such as patients taking cyclosporine, Asian patients, and patients with severe renal insufficiency (see CLINICAL PHARMACOLOGY, Race, and Renal Insufficiency, and Drug Interactions). For patients with marked hypercholesterolemia (LDL-C>190 mg/dL) and aggressive lipid targets, a 20-mg starting dose may be considered. After initiation and/or upon titration of CRESTOR, lipid levels should be analyzed within 2 to 4 weeks and dosage adjusted accordingly. **The 40-mg dose of CRESTOR is reserved only for those patients who have not achieved their LDL-C goal utilizing the 20 mg dose of CRESTOR once daily (see WARNINGS, Myopathy/Rhabdomyolysis). When initiating statin therapy or switching from another statin therapy, the appropriate CRESTOR starting dose should first be utilized, and only then titrated according to the patient's individualized goal of therapy.** **Homozygous Familial Hypercholesterolemia** The recommended starting dose of CRESTOR is 20 [illegible] once daily [illegible] patients with homozygous FH. The maximum recommended daily dose is 40 mg. CRESTOR should [illegible] used in these patients as an adjunct to other lipid-lowering treatments (e.g., LDL apheresis) or if such treatments are unavailable. Response [illegible] therapy should be estimated from pre-apheresis LDL-C levels. **Dosage in Asian Patients** Initiation [illegible] CRESTOR therapy with 5 mg once daily should be considered for Asian patients. The potential for increased systemic exposures relative to Caucasians is relevant when considering escalation of dose in cases where hypercholesterolemia is not adequately controlled at doses of 5, 10, or 20 mg once daily. (See WARNINGS, Myopathy/Rhabdomyolysis, CLINICAL PHARMACOLOGY, Special Populations, Race, and PRECAUTIONS, General). **Dosage in Patients Taking Cyclosporine** [illegible] patients taking cyclosporine, therapy should be limited to CRESTOR [illegible] mg once daily (see WARNINGS, Myopathy/Rhabdomyolysis, and PRECAUTIONS, Drug Interactions). **Concomitant Lipid-Lowering Therapy** The effect of CRESTOR on LDL-C and total-C may be enhanced when used in combination with a bile acid binding resin. [illegible] CRESTOR is used in combination with gemfibrozil, the dose of CRESTOR should be limited to [illegible] mg once daily (see WARNINGS, Myopathy/Rhabdomyolysis, and PRECAUTIONS, Drug Interactions). **Dosage in Patients With Renal Insufficiency** No modification of dosage [illegible] necessary for patients with mild to moderate renal insufficiency. F[illegible] patients with severe renal impairment (CL_{cr} <30 mL/min/1.73 m²) not on hemodialysis, dosing of CRESTOR should be started at 5 mg once daily and not to exceed 10 mg once daily (see PRECAUTIONS, General, and CLINICAL PHARMACOLOGY, Special Populations, Renal Insufficiency).

NOTE: This summary provides important information about CRESTOR. For more information, please ask your doctor or health care professional about the full Prescribing Information and discuss it with them.

Rx only

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Visions of Earth

LUANGWA VALLEY LODGE, ZAMBIA

Checking in With a Trunk

Elephants are creatures of habit. Still, the people at this lodge were astonished that the animals would walk right through the lobby after remodeling blocked access to a favorite mango tree in the lodge courtyard. Though the image is whimsical at first glance, it points to a profound issue: Both elephants and people have laid routes across Africa, many of them crisscrossing one another. Now it's up to us humans to figure out how to coexist in these shared spaces. —*Frans Lanting*

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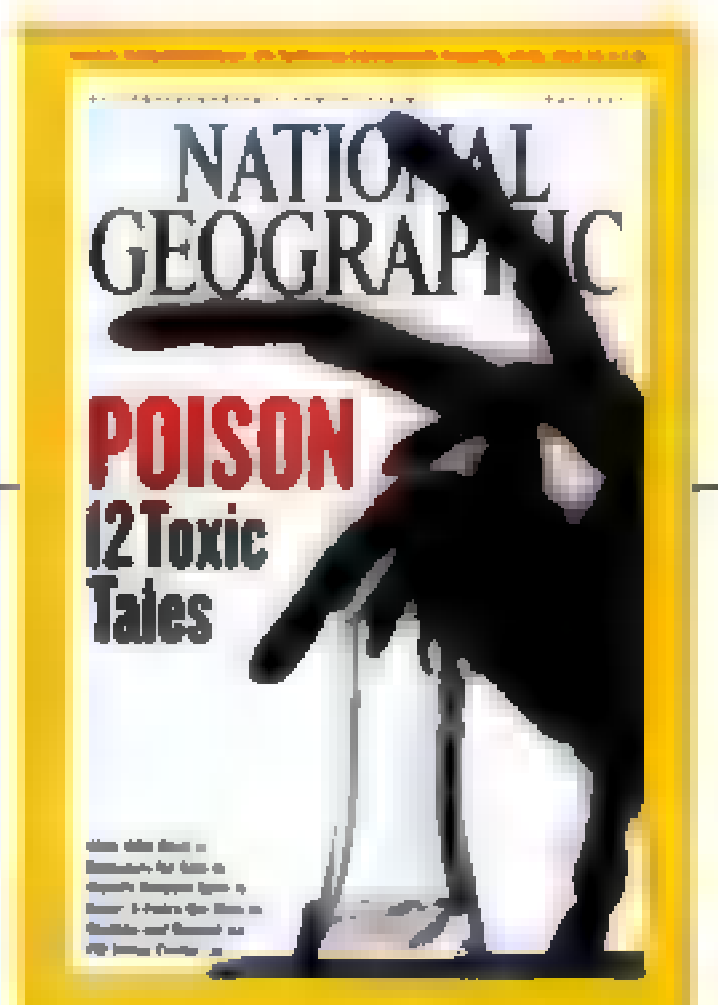

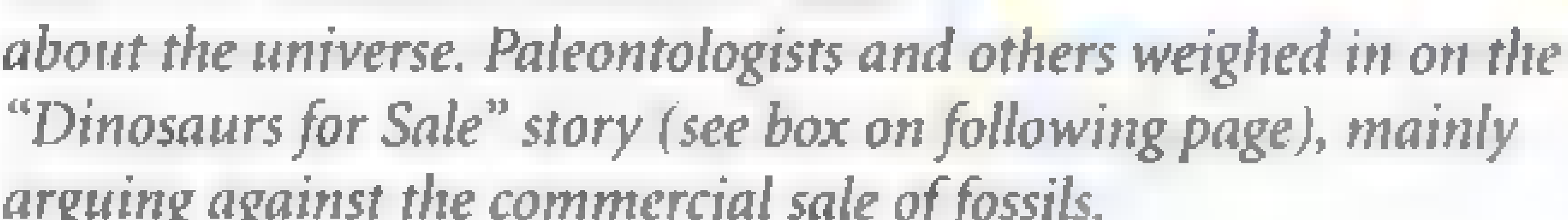

May 2005

"Pick Your Poison" prompted many of you to write in with your personal poison tales, while "Einstein and Beyond" inspired readers to offer their own theories on Einstein's ideas about the universe. Paleontologists and others weighed in on the "Dinosaurs for Sale" story (see box on following page), mainly arguing against the commercial sale of fossils.

Pick Your Poison

Thank you for the wonderful piece on Leon Fleisher. His CD *Two Hands* is beautiful. As a person with dystonia, I also receive Botox injections, and his story was an inspiration. It is amazing how such a poisonous substance can help make people's lives better. Without Botox, I would be in more pain and unable to function as well.

PAT HAEFS
Glastonbury, Connecticut

According to the essay on Zyklon B, the poison was used to kill more than one million people at Auschwitz. When Pope John Paul II visited this site in the 1980s, he blessed memorials that indicated that four million people were murdered there. How did NATIONAL GEOGRAPHIC obtain this lower number?

JOHN F. McKEOWN
Canandaigua, New York

After the fall of the Polish communist government in 1989, the truth about the number of people killed at Auschwitz was revealed. The communist government had inflated the number of non-Jewish Poles who were killed at the camp. Holocaust historians now agree that between 1.1 and 1.5 million people were killed at Auschwitz, most of them Jews.

I teach mythology, and I was surprised to read that Hercules was killed with Hydra venom. I have always taught that the venom that killed the mighty hero was blood from the lustful centaur Nessus. Am I wrong?

DAVID A. KUNKLER
Rushville, Ohio

Not exactly. Hercules slew Nessus with an arrow dipped in Hydra venom. The dying Nessus gave a vial of his blood to Hercules' wife, Deianeira, tricking her into believing that it would ensure the love of her husband. Fearing that Hercules loved another woman, Deianeira soaked his tunic in Nessus' poisoned blood. When Hercules put on the shirt, the Hydra venom in the shirt drove him so mad with pain that he mounted a funeral pyre and demanded his companions light it.

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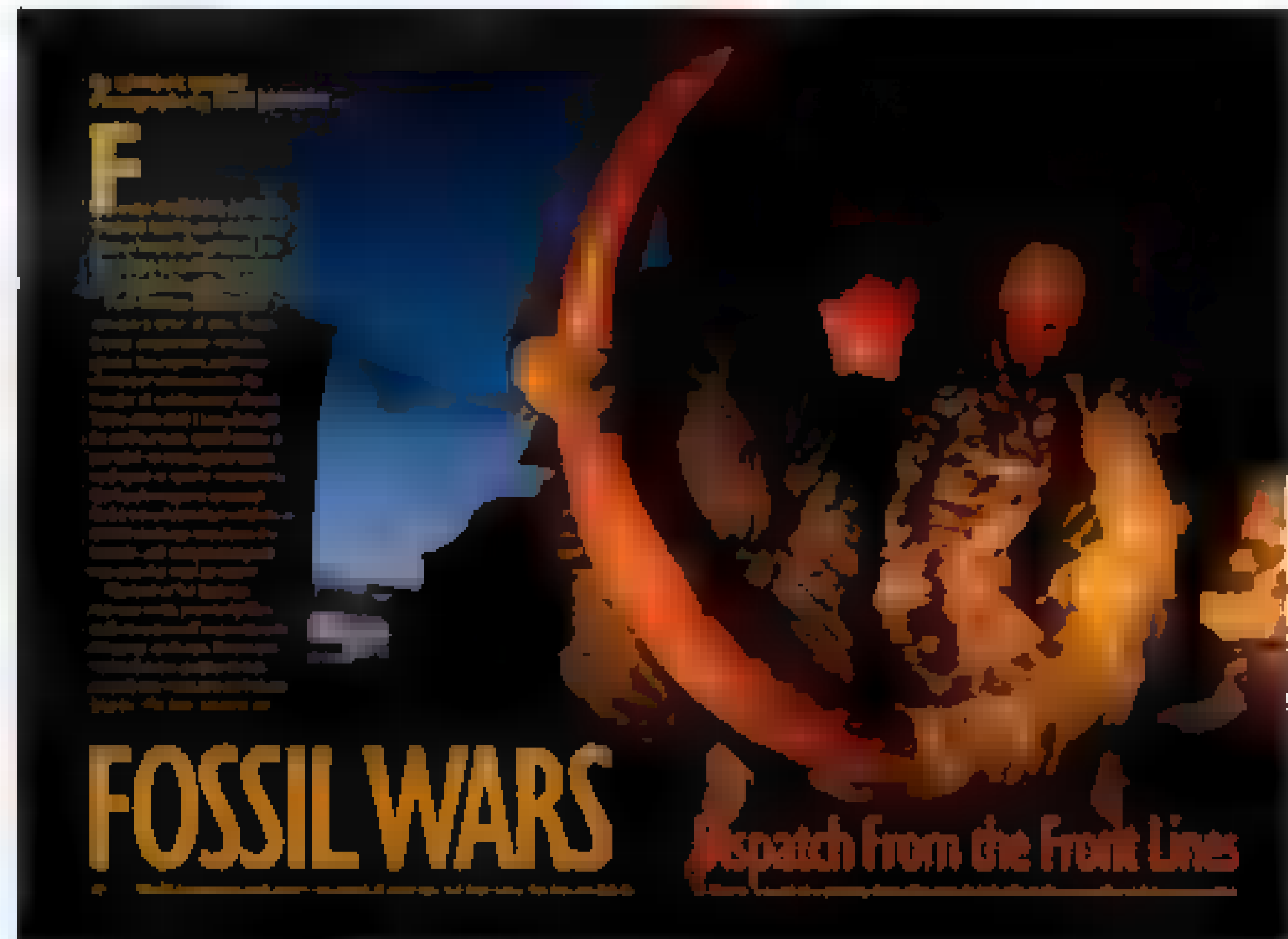

Dinosaurs for Sale

Congratulations on a lopsided report. "Fossil Wars" portrayed commercial fossil dealers as unsung heroes and scientists as veritable inquisitors, greedily attempting to hoard limited fossils for themselves. The article fails to remember that science progresses only when data is available, and that science is done for the long-term benefit of humanity, not the short-term benefit of a few people's pocketbooks.

JERRY D. HARRIS
Director of Paleontology
Dixie State College, St. George, Utah

As a former employee of Mike Triebold, I was heartened by your balanced approach. People like Mike have one thing academics lack—a sound business background. There would be a reinvigoration of paleontology if academics would try to work with the commercial collectors instead of dismissing them all as hacks.

LEE ELLIS
Colorado Springs, Colorado

Almost nothing of what passes into the fossil trade provides any educational benefit; it is simply lost. Fossil dealers do not have time for science as they excavate because time is money. Scientists recently reported soft tissue preserved in a *T. rex.* This would never have seen the light of day if it had been collected by fossil dealers.

KEVIN PADIAN
Museum of Paleontology
University of California, Berkeley

What would be the reaction if this debate was over hominin fossils and the article was called "Humans for Sale"?

JARED AND ALISHA BERNARD
Hilo, Hawaii

I eagerly tore off the wrapping of the May issue—and dropped it, screaming, with my heart pounding and my stomach clenched with fear. I am arachnophobic. Have pity! When choosing cover pictures, please consider that certain images are highly charged for a number of readers.

SHELBY SAMPSON
Richmond, California

I object to the use of a tarantula on the cover with the title "Poison." To the unknowledgeable, the implication is that this spider serves no beneficial purpose and is to be feared and killed. On the contrary, tarantulas consume harmful insects, safely serve educators in the classroom, and are even adopted as pets.

NEIL STANFIELD
Oklahoma City, Oklahoma

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Einstein and Beyond

I'm a lover of science, which is one reason I read NATIONAL GEOGRAPHIC. Yet because I have Asperger's syndrome, I only clean tools at a screen-printing shop. Reading about Einstein's life in a patent office makes me feel much better.

DAVID RUBIN
Staten Island, New York

Over the nearly 50 years that I have subscribed to NATIONAL GEOGRAPHIC, I have often chuckled at scientists either expounding or scratching their heads over matters that have been settled for me long ago by my faith in God. Your article says, "Something out there holds swarms of galaxies together and keeps their stars from flying apart, but scientists still haven't learned what this invisible substance is." Although I am familiar with many of the names of God, this is the first time I have heard Him called Dark Matter.

CLYDE A. BACHELOR
Warrenton, Missouri

You do not need to be Einstein to appreciate the majesty of the universe. However, if one were to attempt to explain the mysteries of dark matter, and for that matter a theory of everything, then the gray matter of the aforementioned genius is a fine place to begin one's contemplations.

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Only in the minds of a select group of thinkers does a universe begin to divulge its secrets. Without them we would all forever be in the dark.

BARRY JIGGINS
Cairns, Queensland

Wide Wild West

The magnificence of the Colorado Plateau shown on a macro scale by Frans Lanting's aerial photography is matched on a more intimate scale on the ground, where we find artifacts from pre-Columbian native cultures such as the Anasazi, Fremont, and Mogollon.

MALCOLM G. BALFOUR
Acme, Pennsylvania

While I share Mike Edwards's reverence for the Colorado Plateau, I strongly object to his mischaracterization of "off-road vehicles plow[ing] tracks that won't disappear for decades." The true situation on the ground in the Grand Staircase–Escalante National Monument is that while there may be a few reckless drivers among the visitors to the area, the majority of recreationists drive on existing roads. The Great Western Trail is a federally designated multiple-use trail that traverses the monument, offering a way for people to experience the area's scenic beauty.

SANFORD COHEN
Prescott Valley, Arizona

The Long Way Down

I do not see the scientific or cultural value of burrowing 2,000 meters into the Earth for its own sake. What I did see in this story of Krubera Cave were silly snapshots of strutting Marlboro men flexing their biceps and living an overgrown boy's fantasy of playing in dirt with high-tech toys and explosives. Equally grating was the shameless self-congratulations, declaring their enterprise on a par with the conquests of the North and South Poles.

TIMOTHY GRIFFIN
Sparks, Nevada

My Seven

I feel that John Swann has overlooked the most important medicine used by mankind for the past hundred years. Were that medicine to be introduced today, it would be hailed as the newest wonder drug. I am speaking of

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aspirin, of course. I am quite sure that more people have used it for pain relief than any other compound. Its use to lessen the effects of heart attacks is well proven.

PETER A. BREWER
Clatskanie, Oregon

ZipUSA: Clarksburg, West Virginia

After reading your article on the FBI center, I had a good laugh at the memory it brought. Yes, Exit 124 is now Jerry Dove Drive, and there is no sign directing you to the FBI center. But when the facility was being built, the exit sign said, in big white letters for all the world to see: FBI Center Road.

KARYN JOHNSON
Glen Burnie, Maryland

I was disturbed by the photo showing children in the FBI's on-site day-care center being "marched" to recess. Can someone explain what educational purpose is served by requiring the children to walk with their hands on their head like they are under arrest?

DIANE TSO
Millburn, New Jersey

Teachers at the Lasting Impressions Child Development Center—a nationally accredited program—employ follow-the-leader type activities to get the children organized and concentrated on going out to recess. Some days they may walk like a duck; other days they may clap their hands. This particular day the teacher asked them to walk outside with their hands on their head.

Flashback

Your Flashback had a resonance for me far beyond anything you likely had in mind when you chose it. W. H. Longley was my mother's much admired big brother. It came as a surprise to me to learn that he had been seriously burned during his adventures with underwater photography. I am inclined to think now that he might never have reported this to his wife, our aunt Hazel.

JAMES F. DOIG
Wolfville, Nova Scotia

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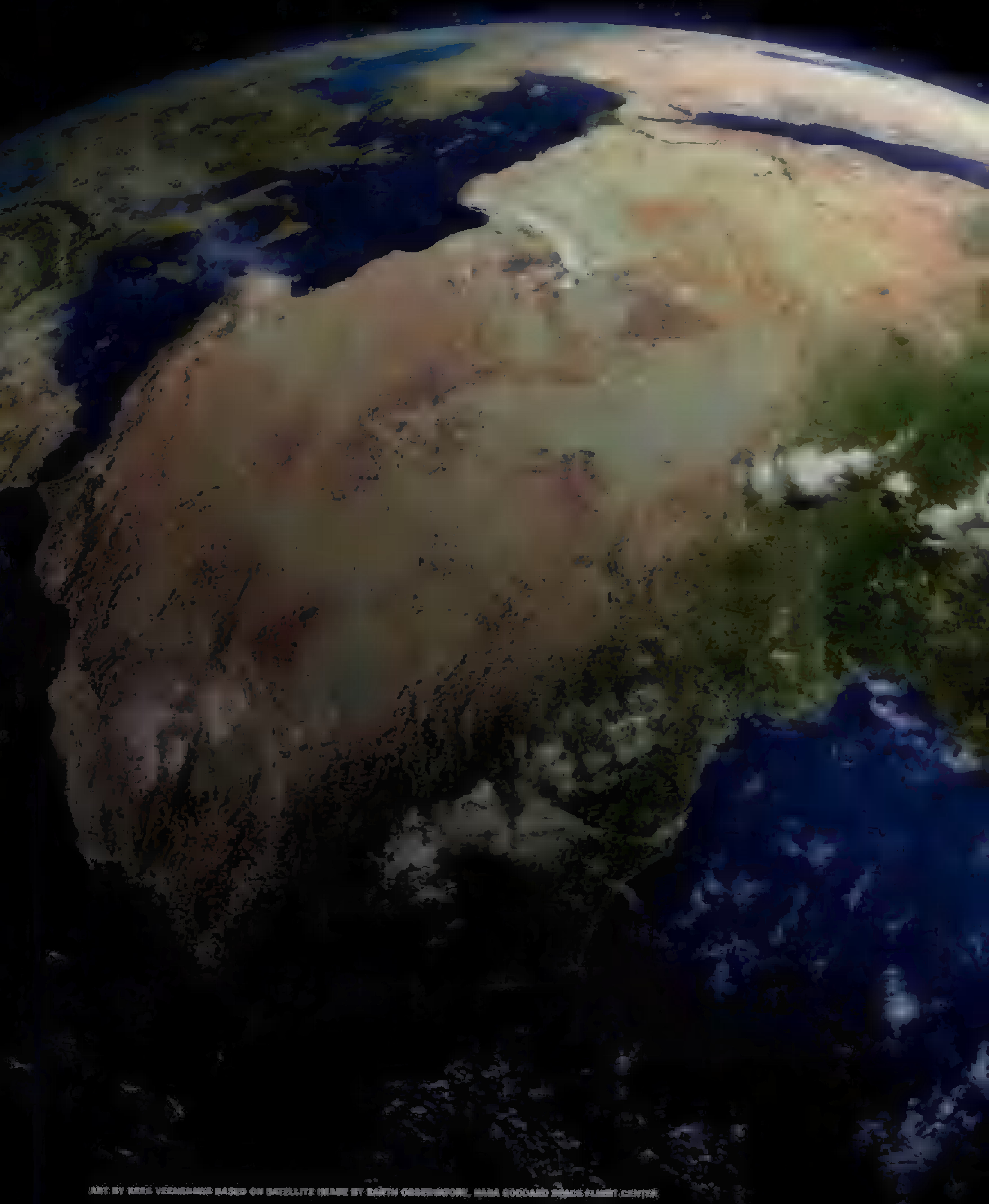


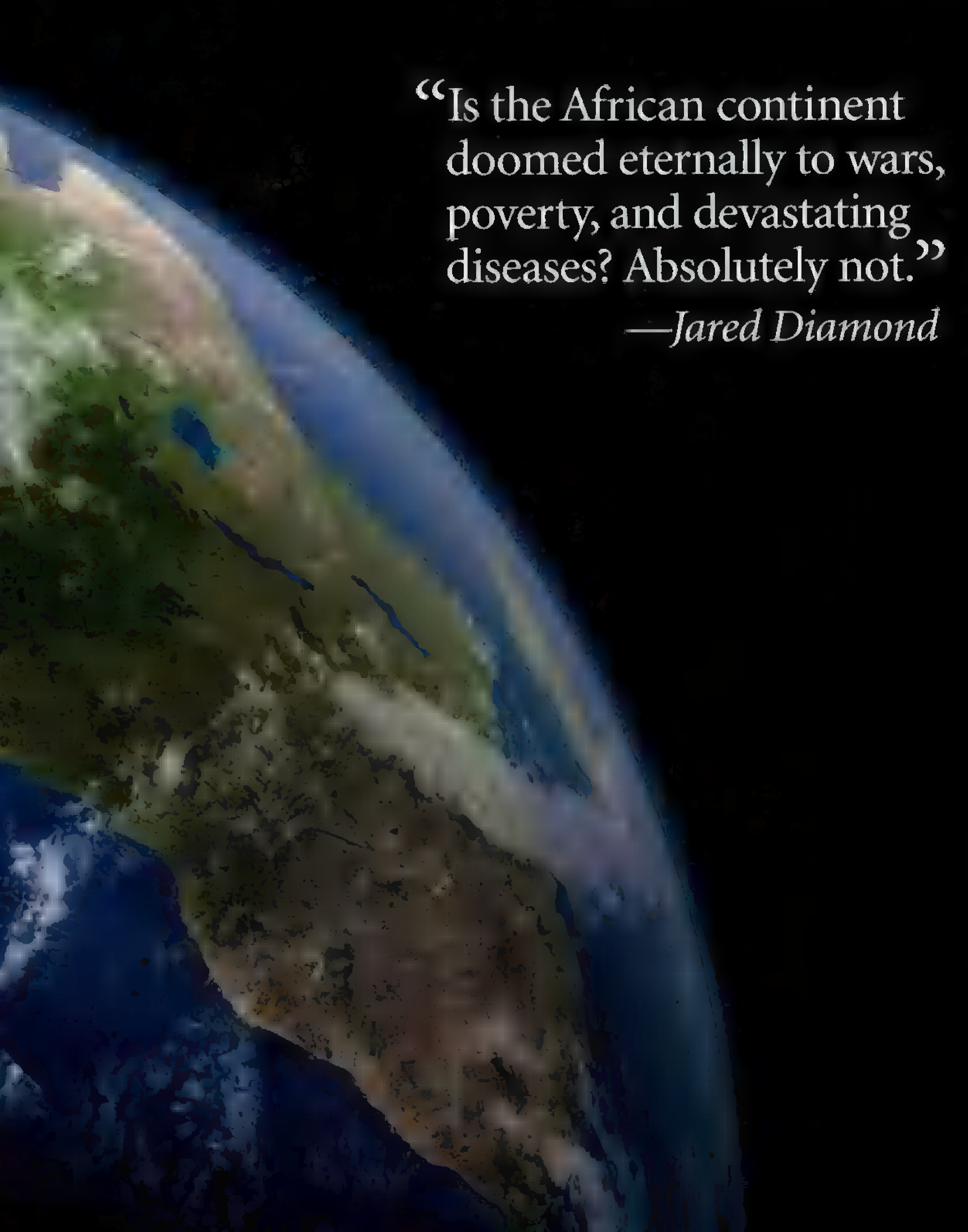
ART BY KEES VEENENBOS BASED ON SATELLITE IMAGE BY EARTH OBSERVATORY, NASA GODDARD SPACE FLIGHT CENTER

APHICA

CREATURES OF OUR UNIVERSE

"Is the African continent doomed eternally to wars, poverty, and devastating diseases? Absolutely not."

—*Jared Diamond*



The Shape of Africa

By Jared Diamond

Ask someone to tell you quickly what they associate with Africa, and the answers you'll get will probably range from "cradle of humankind" and "big animals" to "poverty" and "tribalism." How did one continent come to embody such extremes?

Geography and history go a long way toward providing the explanations. Geographically, Africa resembles a bulging sandwich. The sole continent to span both the north and south temperate zones, it has a thick tropical core lying between one thin temperate zone in the north and another in the south. That simple geographic reality explains a great deal about Africa today.

As to its human history, this is the place where some seven million years ago the evolutionary lines of apes and protohumans diverged. It remained the only continent our ancestors inhabited until around two million years ago, when *Homo erectus* expanded out of Africa into Europe and Asia. Over the next 1.5 million years the populations of those three continents followed such different evolutionary courses that they became distinct species. Europe's became the Neandertals, Asia's remained *Homo erectus*, but Africa's evolved into our own species, *Homo sapiens*. Sometime between 100,000 and 50,000 years ago our African ancestors underwent some further profound change. Whether it was the development of complex speech or something else, such as a change in brain wiring, we aren't sure. Whatever it was, it transformed those early *Homo sapiens* into what paleoanthropologists call "behaviorally modern" *Homo sapiens*. Those people, probably with brains similar to our own, expanded again into Europe and Asia. Once there, they exterminated or replaced or interbred with Neandertals and Asia's hominins and became the dominant human species throughout the world.

In effect, Africans enjoyed not just one but three huge head starts over humans on other continents. That makes Africa's economic struggles today, compared with the successes of other continents, particularly puzzling. It's the opposite of what one would expect from the runner first off the block. Here again geography and history give us answers.

It turns out that the rules of the competitive race among the world's humans changed radically about 10,000 years ago, with the origins of agriculture. The domestication of wild plants and animals meant our ancestors could grow their own food instead of having to hunt or gather it in the wild. That allowed people to settle in permanent villages, to

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Rock art created some 2,500 years ago still survives in northern Niger's mountainous Aïr region and in other parts of the central Sahara.

increase their populations, and to feed specialists—inventors, soldiers, and kings—who did not produce food. With domestication came other advances, including the first metal tools, writing, and state societies.

The problem is that only a tiny minority of wild plants and animals lend themselves to domestication, and those few are concentrated in about half a dozen parts of the world. As every schoolchild learns, the world's earliest and most productive farming arose in the Fertile Crescent of southwestern Asia, where wheat, barley, sheep, cattle, and goats were domesticated. While those plants and animals spread east and west in Eurasia, in Africa they were stopped by the continent's north-south orientation. Crops and livestock tend to spread much more slowly from north to south than from east to west, because different latitudes require adaptation to different climates, seasonalities, day lengths, and diseases. Africa's own native plant species—sorghum, oil palm, coffee, millets, and yams—weren't domesticated until thousands of years after Asia and Europe had agriculture. And Africa's geography kept oil palm, yams, and other crops of equatorial Africa from spreading into southern Africa's temperate zone. While South Africa today boasts the continent's richest agricultural lands, the crops grown there are mostly northern temperate crops, such as wheat and grapes, brought directly on ships by European colonists. Those same crops never succeeded in spreading south through the thick tropical core of Africa.

The domesticated sheep and cattle of Fertile Crescent origins took about 5,000 years to spread from the Mediterranean down to the southern tip of Africa. The continent's own native animals—with the exception of guinea fowl and possibly donkeys and one breed of cattle—proved impossible to domesticate. History might have turned out differently if African armies, fed by barnyard-giraffe meat and backed by waves of cavalry mounted on huge rhinos, had swept into Europe to overrun its mutton-fed soldiers mounted on puny horses. That this didn't happen was no fault of the Africans; it was because of the kinds of wild animals available to them.

DAVID COULSON, TARA

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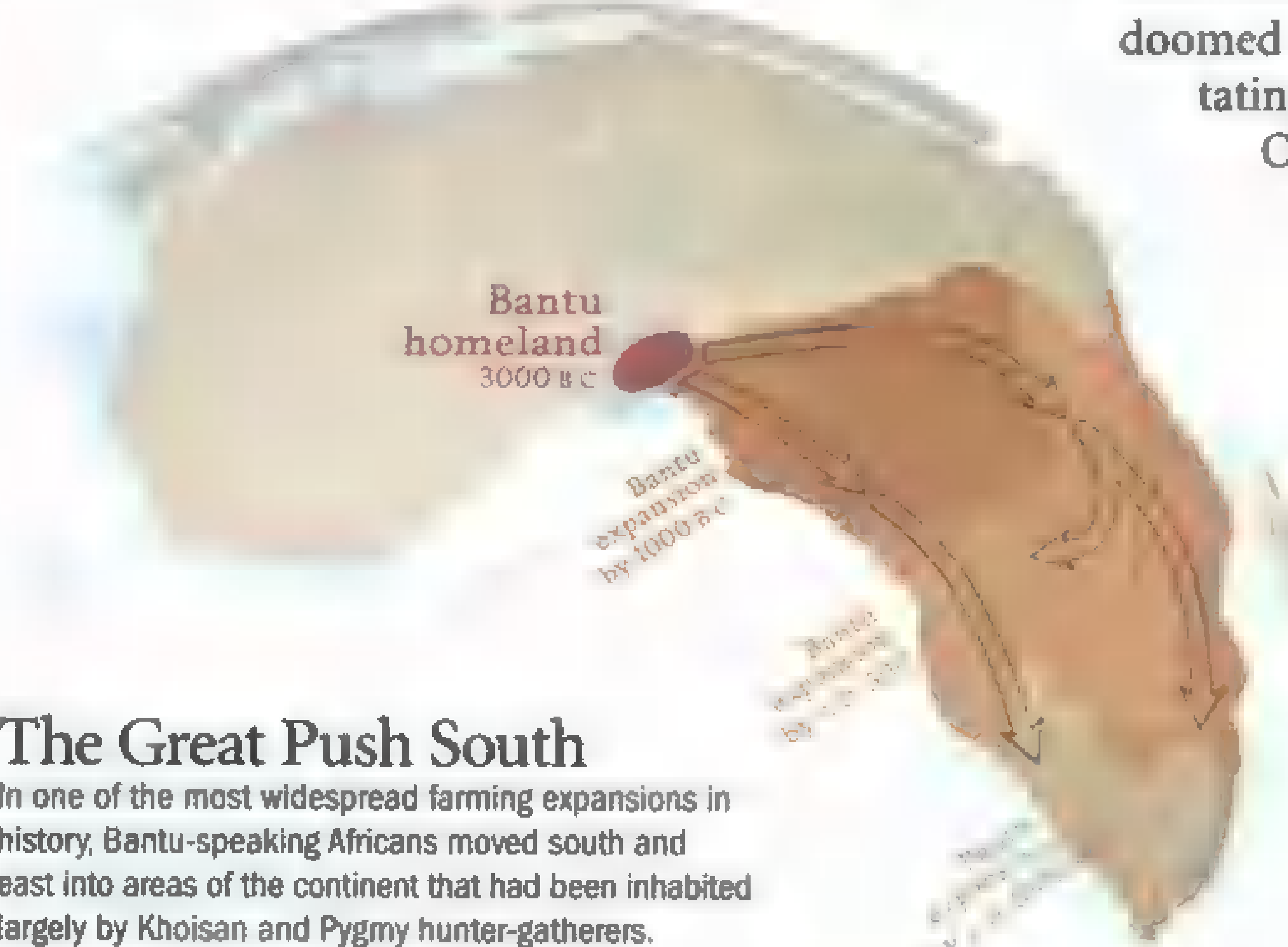
Ironically, the long human presence in Africa is probably the reason the continent's species of big animals survive today. African animals co-evolved with humans for millions of years, as human hunting prowess gradually progressed from the rudimentary skills of our early ancestors. That gave the animals time to learn a healthy fear of man, and with it a healthy avoidance of human hunters. In contrast, North and South America and Australia were settled by humans only within the last tens of thousands of years. To the misfortune of the big animals of those continents, the first humans they encountered were already fully modern people, with modern brains and hunting skills. Most of those animals—woolly mammoths, saber-toothed cats, and in Australia marsupials as big as rhinoceroses—disappeared soon after humans arrived. Entire species may have been exterminated before they had time to learn to beware of hunters.

Unfortunately the long human presence in Africa also encouraged something else to thrive—diseases. The continent has a well-deserved reputation for having spawned some of our nastiest ones: malaria, yellow fever, East African sleeping sickness, and AIDS. These and many other human illnesses arose when microbes causing disease in animals crossed species lines to evolve into a human disease. For a microbe already adapted to one species to adapt to another can be difficult and require a lot of evolutionary time. Much more time has been available in Africa, cradle of humankind, than in any other part of the planet. That's half the answer to Africa's disease burden; the other half is that the animal species most closely related to humans —those whose microbes required the least adaptation to jump species—are the African great apes and monkeys.

Africa continues to be shaped in other ways by its long history and its geography. Of mainland Africa's ten richest countries—the only ones with annual per capita gross domestic products over $3,500—nine lie partly or entirely within its temperate zones: Egypt, Libya, Tunisia, Algeria, and Morocco in the north; and Swaziland, South Africa, Botswana, and Namibia in the south. Gabon is Africa's only tropical country to make the list. In addition, nearly a third of the countries of mainland Africa (15 out of 47) are landlocked, and the only African river navigable from the ocean for long distances inland is the Nile. Since waterways provide the cheapest way to transport cumbersome goods, geography again thwarts Africa's progress.

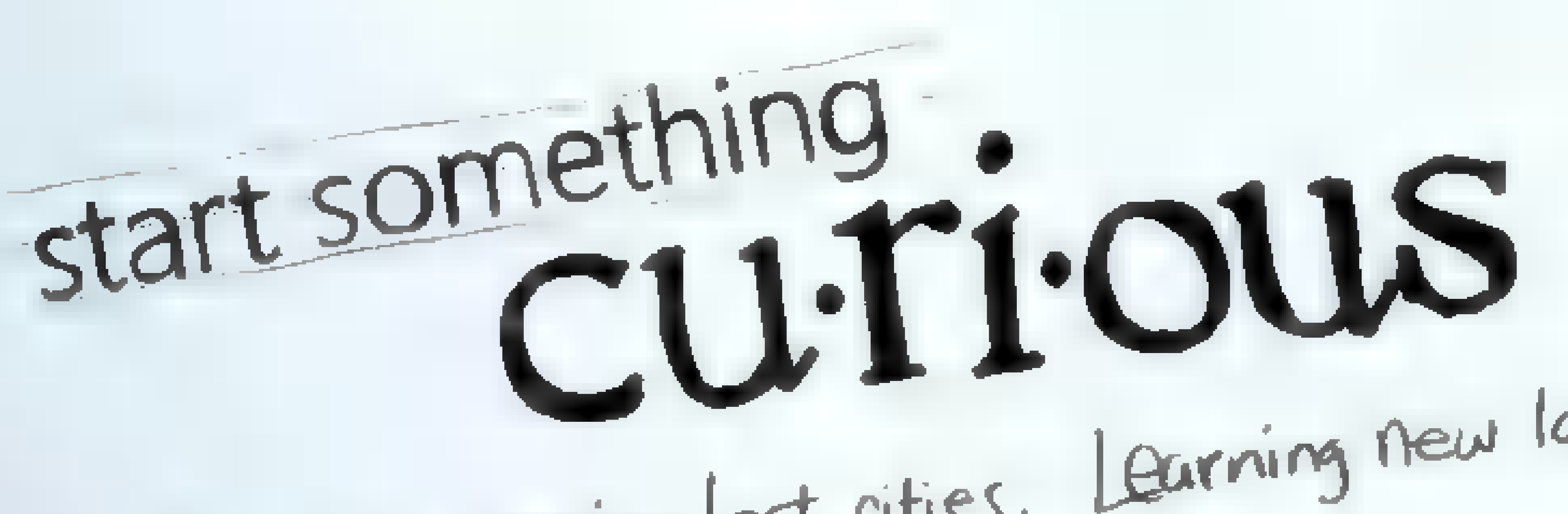
Africa continues to be shaped by its long history and its geography.

All these factors can lead to the question: Is the continent, or at least its big tropical core, doomed eternally to wars, poverty, and devastating diseases? I'd answer: Absolutely not. On my own visits to Africa, I've been struck by how harmoniously ethnic groups live together in many countries—far better than they do in many other parts of the globe. Tensions arise in Africa, as they do elsewhere, when people see no other way out of poverty except to fight their neighbors for dwindling resources. But many areas of



The Great Push South

In one of the most widespread farming expansions in history, Bantu-speaking Africans moved south and east into areas of the continent that had been inhabited largely by Khoisan and Pygmy hunter-gatherers.



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From Colony to Country: African Nationhood

Present-day names and boundaries are shown. Colors represent European colonial control as of 1914. Most countries gained independence in the 1960s; dates for those that did not are in parentheses. Most island nations are not labeled.

Belgium
Britain
France
Germany
Italy
Portugal
Spain
Independent

NATIONAL GEOGRAPHIC MAPS

Africa have an abundance of resources: The rivers of central Africa are great generators of hydroelectric power; the big animals are a major source of ecotourism revenue in eastern and southern Africa; and the forests in the wetter regions, if managed and logged sustainably, would be renewable and lucrative sources of income.

As for Africa's health problems, they can be greatly alleviated with the right planning and funding. Within the past half century several formerly poor countries in Asia recognized that tropical diseases were a major drain on their economies. By investing in public health measures, they have successfully curbed those diseases, and the increased health of their people has led to far healthier economies. Within Africa itself, some international mining and oil companies have been funding successful public health programs throughout their concession areas because they realized that protecting the health of their workers was an excellent business investment for them.

What's the best case for Africa's future? If the continent can overcome its health problems and the corruption that plagues many of its governments and institutions, then it could take advantage of today's globalized, technological world in much the same way that China and India are now doing. Technology could give Africa the connections that its geography, particularly its rivers, long denied it. Nearly half of all African countries are English speaking, an advantage in trade relations, and an educated, English-speaking workforce could well attract service jobs to many African countries.

If Africa is to head into a bright future, outside investment will continue to be needed, at least for a time. The cost of perpetual aid to or military intervention in Africa is thousands of times more expensive than solving health problems and supporting local development, thereby heading off conflicts. Not only Africans but the rest of us will be healthier and safer if Africa's nations increasingly take their places as peaceful and prospering members of the world community. □

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Rev. May 2003a
Brief Summary

ALLEGRA®
(fexofenadine hydrochloride) Capsules and Tablets

INDICATIONS AND USAGE **Seasonal Allergic Rhinitis** ALLEGRA is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 6 years of age and older. Symptoms treated effectively were sneezing, rhinorrhea, itchy nose/palate/throat, itchy/watery/red eyes. **Chronic Idiopathic Urticaria** ALLEGRA is indicated for treatment of uncomplicated skin manifestations of chronic idiopathic urticaria in adults and children 6 years of age and older. It significantly reduces pruritus and the number of wheals. **CONTRAINDICATIONS** ALLEGRA is contraindicated in patients with known hypersensitivity to any of its ingredients. **PRECAUTIONS** **Drug Interaction with Erythromycin and Ketoconazole** Fexofenadine hydrochloride has been shown to exhibit minimal (ca. 5%) metabolism. However, co-administration of fexofenadine hydrochloride with ketoconazole and erythromycin led to increased plasma levels of fexofenadine hydrochloride. Fexofenadine hydrochloride had no effect on the pharmacokinetics of erythromycin and ketoconazole. In two separate studies, fexofenadine hydrochloride 120 mg twice daily (two times the recommended twice daily dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QT_c interval were observed when patients were administered fexofenadine hydrochloride alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on steady-state fexofenadine hydrochloride pharmacokinetics after 7 days of co-administration with fexofenadine hydrochloride 120 mg every 12 hours (two times the recommended twice daily dose) in normal volunteers (n=24)

Concomitant Drug	$C_{max,ss}$ *(Peak plasma concentration)*	$AUC_{ss(0-12h)}$ *(Extent of systemic exposure)*
Erythromycin (500 mg every 8 hrs)	+82%	+109%
Ketoconazole (400 mg once daily)	+135%	+164%

The changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials. The mechanism of these interactions has been evaluated in *in vitro*, *in situ*, and *in vivo* animal models. These studies indicate that ketoconazole or erythromycin co-administration enhances fexofenadine gastrointestinal absorption. *In vivo* animal studies also suggest that in addition to increasing absorption, ketoconazole decreases fexofenadine hydrochloride gastrointestinal secretion, while erythromycin may also decrease biliary excretion. **Drug Interactions with Antacids** Administration of 120 mg of fexofenadine hydrochloride (2 x 60 mg capsule) within 15 minutes of an aluminum and magnesium containing antacid (Maalox®) decreased fexofenadine AUC by 41% and C_{max} by 43%. ALLEGRA should not be taken closely in time with aluminum and magnesium containing antacids. **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine hydrochloride exposure (based on plasma area-under-the-concentration vs. time [AUC] values). No evidence of carcinogenicity was observed in an 18-month study in mice and in a 24-month study in rats at oral doses up to 150 mg/kg of terfenadine (which led to fexofenadine exposures that were respectively approximately 3 and 5 times the exposure from the maximum recommended daily oral dose of fexofenadine hydrochloride in adults and children). In *in vitro* (Bacterial Reverse Mutation, CHO/HGPRT Forward Mutation, and Rat Lymphocyte Chromosomal Aberration assays) and *in vivo* (Mouse Bone Marrow Micronucleus assay) tests, fexofenadine hydrochloride revealed no evidence of mutagenicity. In rat fertility studies, dose-related reductions in implants and increases in postimplantation losses were observed at an oral dose of 150 mg/kg of terfenadine (which led to fexofenadine hydrochloride exposures that were approximately 3 times the exposure of the maximum recommended daily oral dose of fexofenadine hydrochloride in adults). **Pregnancy** **Teratogenic Effects: Category C.** There was no evidence of teratogenicity in rats or rabbits at oral doses of terfenadine up to 300 mg/kg (which led to fexofenadine exposures that were approximately 4 and 31 times, respectively, the exposure from the maximum recommended daily oral dose of fexofenadine in adults). There are no adequate and well controlled studies in pregnant women. Fexofenadine should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nonteratogenic Effects.** Dose-related decreases in pup weight gain and survival were observed in rats exposed to an oral dose of 150 mg/kg of terfenadine (approximately 3 times the maximum recommended daily oral dose of fexofenadine hydrochloride in adults based on comparison of fexofenadine hydrochloride AUCs). **Nursing Mothers** There are no adequate and well-controlled studies in women during lactation. Because many drugs are excreted in human milk, caution should be exercised when fexofenadine hydrochloride is administered to a nursing woman. **Pediatric Use** The recommended dose in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adults and pediatric patients and on the safety profile of fexofenadine hydrochloride in both adult and pediatric patients at doses equal to or higher than the recommended doses. The safety of ALLEGRA tablets at a dose of 30 mg twice daily has been demonstrated in 438 pediatric patients 6 to 11 years of age in two placebo-controlled 2-week seasonal allergic rhinitis trials. The safety of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adult and pediatric patients and on the safety profile of fexofenadine in both adult and pediatric patients at doses equal to or higher than the recommended dose. The effectiveness of ALLEGRA for the treatment of seasonal allergic rhinitis in patients 6 to 11 years of age was demonstrated in one trial (n=411) in which ALLEGRA tablets 30 mg twice daily significantly reduced total symptom scores compared to placebo, along with extrapolation of demonstrated efficacy in patients ages 12 years and above, and the pharmacokinetic comparisons in adults and children. The effectiveness of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on an extrapolation of the demonstrated efficacy of ALLEGRA in adults with this condition and the likelihood that the disease course, pathophysiology and the drug's effect are substantially similar in children to that of adult patients. Three clinical safety studies comparing 15 mg BID (n=85) and 30 mg BID (n=330) of an experimental formulation of fexofenadine to placebo (n=430) have been conducted in pediatric patients aged 6 months to 5 years. In general, fexofenadine hydrochloride was well tolerated in these studies. No unexpected adverse events were seen given the known safety profile of fexofenadine and likely adverse reactions for this patient population. (See ADVERSE REACTIONS and CLINICAL PHARMACOLOGY.) The safety and effectiveness of fexofenadine hydrochloride in pediatric patients under 6 years of age have not been established. **Geriatric Use** Clinical studies of ALLEGRA tablets and capsules did not include sufficient numbers of subjects aged 65 years and over to determine whether this population responds differently from younger patients. Other reported clinical experience has not identified differences in responses between the geriatric and younger patients. This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and may be useful to monitor renal function. (See CLINICAL PHARMACOLOGY.) **ADVERSE REACTIONS** **Seasonal Allergic Rhinitis** **Adults.** In placebo-controlled seasonal allergic rhinitis clinical trials in patients 12 years of age and older, which included 2461 patients receiving fexofenadine hydrochloride capsules at doses of 20 mg to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. All adverse events that were reported by greater than 1% of patients who received the recommended daily dose of fexofenadine hydrochloride (60 mg capsules twice daily), and that were more common with fexofenadine hydrochloride than placebo, are listed in Table 1. In a placebo-controlled clinical study in the United States, which included 570 patients aged 12 years and older receiving fexofenadine hydrochloride tablets at doses of 120 or 180 mg once daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 1 also lists adverse experiences that were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at doses of 180 mg once daily and that were more common with fexofenadine hydrochloride than placebo. The incidence of adverse events, including drowsiness, was not dose-related and was similar across subgroups defined by age, gender, and race.

Table 1
Adverse experiences in patients ages 12 years and older reported in placebo-controlled seasonal allergic rhinitis clinical trials in the United States

Twice daily dosing with fexofenadine capsules at rates of greater than 1%

Adverse experience	*Fexofenadine 60 mg Twice Daily (n=679)*	*Placebo Twice Daily (n=671)*
Viral infection (cold, flu)	2.5%	1.5%
Nausea	1.6%	1.5%
Dysmenorrhea	1.5%	0.3%
Drowsiness	1.3%	0.9%
Dyspepsia	1.3%	0.6%
Fatigue	1.3%	0.9%

Once daily dosing with fexofenadine hydrochloride tablets at rates of greater than 2%

Adverse experience	*Fexofenadine 180 mg once daily (n=283)*	*Placebo (n=293)*
Headache	10.6%	7.5%
Upper Respiratory Tract Infection	3.2%	3.1%
Back Pain	2.8%	1.4%

The frequency and magnitude of laboratory abnormalities were similar in fexofenadine hydrochloride and placebo-treated patients. **Pediatric.** Table 2 lists adverse experiences in patients aged 6 to 11 years of age which were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at a dose of 30 mg twice daily in placebo-controlled seasonal allergic rhinitis studies in the United States and Canada that were more common with fexofenadine hydrochloride than placebo.

Table 2
Adverse experiences reported in placebo-controlled seasonal allergic rhinitis studies in pediatric patients ages 6 to 11 in the United States and Canada at rates of greater than 2%

Adverse experience	*Fexofenadine 30 mg twice daily (n=209)*	*Placebo (n=229)*
Headache	7.2%	6.6%
Accidental Injury	2.9%	1.3%
Coughing	3.8%	1.3%
Fever	2.4%	0.9%
Pain	2.4%	0.4%
Otitis Media	2.4%	0.0%
Upper Respiratory Tract Infection	4.3%	1.7%

Three clinical safety studies in 845 children aged 6 months to 5 years comparing 15 mg BID (n=85) and 30 mg BID (n=330) of an experimental formulation of fexofenadine to placebo (n=430) have been conducted. In general, fexofenadine hydrochloride was well tolerated in these studies. No unexpected adverse events were seen given the known safety profile of fexofenadine and likely adverse reactions for this patient population. (See PRECAUTIONS Pediatric Use.) **Chronic Idiopathic Urticaria** Adverse events reported by patients 12 years of age and older in placebo-controlled chronic idiopathic urticaria studies were similar to those reported in placebo-controlled seasonal allergic rhinitis studies. In placebo-controlled chronic idiopathic urticaria clinical trials, which included 726 patients 12 years of age and older receiving fexofenadine hydrochloride tablets at doses of 20 to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 3 lists adverse experiences in patients aged 12 years and older which were reported by greater than 2% of patients treated with fexofenadine hydrochloride 60 mg tablets twice daily in controlled clinical studies in the United States and Canada and that were more common with fexofenadine hydrochloride than placebo. The safety of fexofenadine hydrochloride in the treatment of chronic idiopathic urticaria in pediatric patients 6 to 11 years of age is based on the safety profile of fexofenadine hydrochloride in adults and adolescent patients at doses equal to or higher than the recommended dose (see Pediatric Use).

Table 3
Adverse experiences reported in patients 12 years and older in placebo-controlled chronic idiopathic urticaria studies in the United States and Canada at rates of greater than 2%

Adverse experience	*Fexofenadine 60 mg twice daily (n=186)*	*Placebo (n=178)*
Back Pain	2.2%	1.1%
Sinusitis	2.2%	1.1%
Dizziness	2.2%	0.6%
Drowsiness	2.2%	0.0%

Events that have been reported during controlled clinical trials involving seasonal allergic rhinitis and chronic idiopathic urticaria patients with incidences less than 1% and similar to placebo and have been rarely reported during postmarketing surveillance include: insomnia, nervousness, and sleep disorders or paroniria. In rare cases, rash, urticaria, pruritus and hypersensitivity reactions with manifestations such as angioedema, chest tightness, dyspnea, flushing and systemic anaphylaxis have been reported. **OVERDOSAGE** Reports of fexofenadine hydrochloride overdose have been infrequent and contain limited information. However, dizziness, drowsiness, and dry mouth have been reported. Single doses of fexofenadine hydrochloride up to 800 mg (six normal volunteers at this dose level), and doses up to 690 mg twice daily for 1 month (three normal volunteers at this dose level) or 240 mg once daily for 1 year (234 normal volunteers at this dose level) were administered without the development of clinically significant adverse events as compared to placebo. In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Hemodialysis did not effectively remove fexofenadine hydrochloride from blood (1.7% removed) following terfenadine administration. No deaths occurred at oral doses of fexofenadine hydrochloride up to 5000 mg/kg in mice (110 times the maximum recommended daily oral dose in adults and 200 times the maximum recommended daily oral dose in children based on mg/m^2) and up to 5000 mg/kg in rats (230 times the maximum recommended daily oral dose in adults and 400 times the maximum recommended daily oral dose in children based on mg/m^2). Additionally, no clinical signs of toxicity or gross pathological findings were observed. In dogs, no evidence of toxicity was observed at oral doses up to 2000 mg/kg (300 times the maximum recommended daily oral dose in adults and 530 times the maximum recommended daily oral dose in children based on mg/m^2). **DOSAGE AND ADMINISTRATION** **Seasonal Allergic Rhinitis** **Adults and Children 12 Years and Older.** The recommended dose of ALLEGRA is 60 mg twice daily, or 180 mg once daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Children 6 to 11 Years.** The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Chronic Idiopathic Urticaria** **Adults and Children 12 Years and Older.** The recommended dose of ALLEGRA is 60 mg twice daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Children 6 to 11 Years.** The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY).

Please see product circular for full prescribing information.

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Rev. May 2003a
Brief Summary
Aventis Pharmaceuticals Inc.
Kansas City, MO 64137 USA
US Patents 4,254,129; 5,375,693; 5,578,610
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A militiaman prepares to disarm under a UN-Congolese program in the Democratic Republic ■ the Congo (far left). Traffic jams Lagos, Nigeria, where the population has increased 64 percent in a decade. Rivers in Mali are used for bathing and drinking.

Africa in Fact

A continent's numbers tell its story

Percent of world's total landmass: 20

Population: 900 million, 14 percent of world total

Percent of population under age 25: 71

Annual rate of growth in Africa's urban populations: 3.5 percent a year

Most populous city: Lagos, Nigeria, with 16.9 million

Most populous nation: Nigeria, with 131 million

Number of refugees: 15 million—3.3 million who have fled their native countries because of conflict, some 12 million who are internally displaced

Number of languages spoken: Over 2,000

Number of Muslims: 358 million

Number of Christians: 410 million

Number of democratic governments: 19 of a total of 53 nations

Percent of population dependent on agriculture for a living: 66

Average income: 50 percent of Africans live on less than $1 ■ day

Richest nation: Mauritius, with a per capita GDP of $12,800

Poorest nations: Burundi, Malawi, Sierra Leone, Somalia all have per capita GDPs of $600

Number of heavily indebted poor countries: 32 of the 38 nations worldwide classified as such by IMF-World Bank

Percent of population with access to improved drinking water: Sub-Saharan Africa–82 urban, 45 rural; North Africa–96 urban, 84 rural

Number of firearms in sub-Saharan Africa: 30 million

Infant mortality rates (birth to one year old): 102 of 1,000 in sub-Saharan Africa; 33 of 1,000 in North Africa

Average life expectancy: 46 in sub-Saharan Africa; 67 in North Africa

Most common cause of death: AIDS

Literacy rates (15 years and older): 60 percent

Most literate country: Seychelles, with a 92 percent literacy rate

Least literate: Burkina Faso, with ■ 12.8 percent rate

—*Charles E. Cobb, Jr.*

GUY CALAF, WORLDPICTURENEWS (LEFT); STUART FRANKLIN, MAGNUM PHOTOS (TOP); KAREN KASMAUSKI

Russian Desman *(Desmana moschata)*
Size: Head and body length, 18-21 cm; tail, 17-20 cm **Weight:** 400-520 g
Habitat: Small floodplain lakes of the Volga, Don and Ural river basins in Russia, Ukraine and Kazakhstan
Surviving number: Fewer than 30,000

Photographed by Nikolai Shpilenok

WILDLIFE AS CANON SEES IT

This is one nose that really comes in handy. The Russian desman's prominent proboscis breaches the surface like a periscope, taking in air as the little swimmer searches for snails, aquatic insects and the occasional slow-moving fish. A streamlined head, webbed feet and dense, waterproof fur complete a package perfectly designed for life in the water. Even the desman's front door is submerged; it digs dens with underwater entrances to hide from predators. But it can't hide from the illegal fishing nets that claim so many desman lives. Or from the agricultural development that has reshaped so much of its habitat.

As an active, committed global corporation, we join worldwide efforts to promote awareness of endangered species. Just one way we are working to make the world a better place—today and tomorrow.

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In Bwhonda, Uganda, a cell phone user climbs a tree to get a signal, a necessary tactic in some remote areas. Demand for the phones is growing in places like Sudan, where a salesman (below) awaits customers.

Making the Connection

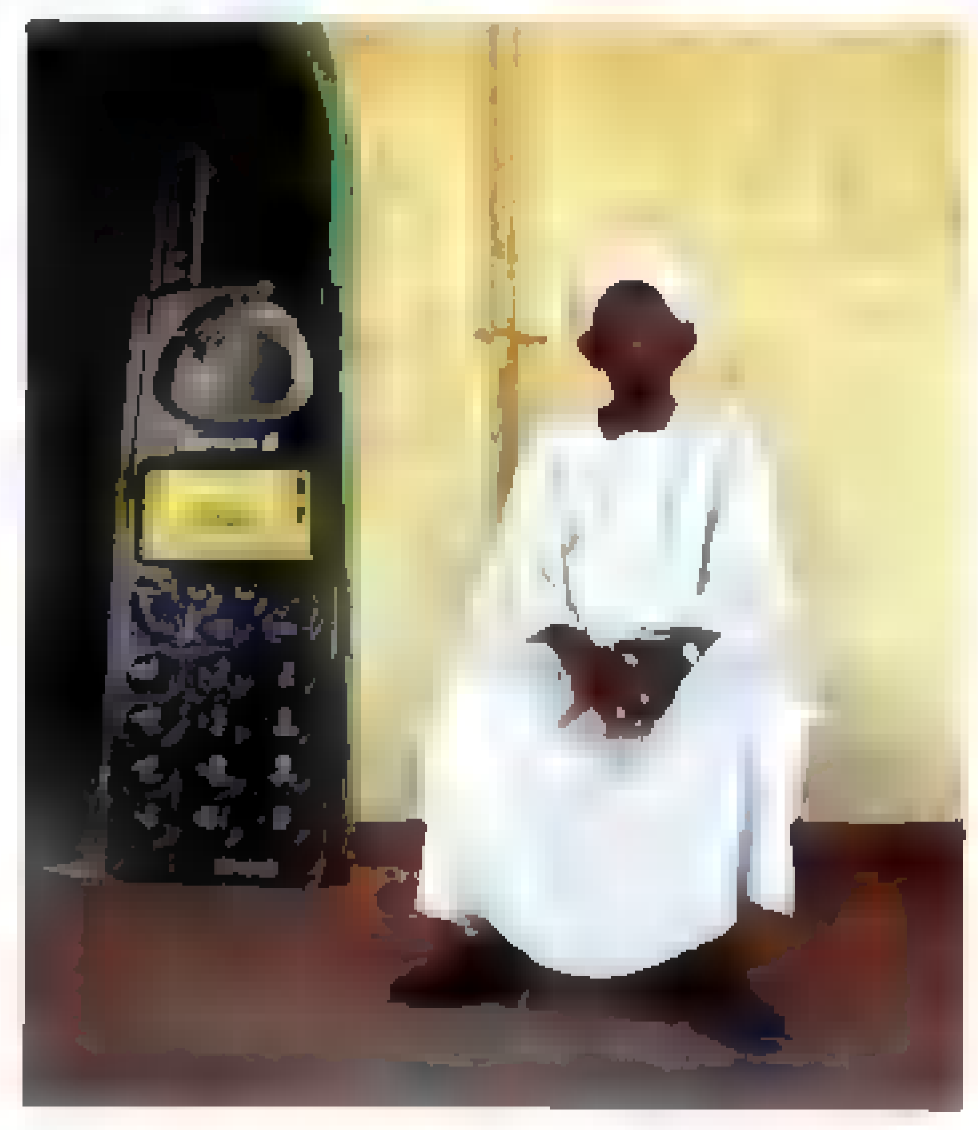
The jump from wired to wireless is changing Africa

In parts of Africa, long-standing obstacles—a lack of roads, unreliable energy sources, political instability, corruption—have prevented the wiring necessary for services like electricity or landline telephones. But new technologies are allowing many places to bypass their poor infrastructure—and access modern conveniences.

Today 70 percent of Africa's telephone subscribers are connected via cellular phones. Some regions now served have never had telephone access before. "It's easier and cheaper to set up cell towers in remote places like southern Sudan than to string a bunch of wire overland," says Peter Henderson, an entrepreneur in the region. Previously, he says, the closest landline telephone was a week's trek away in Uganda.

But Africans are turning to technology for more than just talk. Shepherds in the drought-ridden Sahel region are using handheld GPS units and cell phones to alert each other to areas with good grazing. In Nairobi, some bank customers avoid long lines by monitoring their accounts via text messaging.

Sebene Selassie works with a group training Ethiopian teachers to use solar-powered satellite radios to receive lessons broadcast to their classes. "I think we've just begun to see how technology can be used to address people's needs in Africa," she says. —*Peter Gwin*



- **Number of African landline phones:** 25 million in 2003
- **Number of African cell phone subscribers:** 52 million in 2003
- **Number of personal computers in sub-Saharan Africa:** 12 per thousand people in 2003
- **Africans with direct access to reliable sources of electricity:** Fewer than 1 in 5—in some rural areas, fewer than 1 in 50

MARCO LONGARI, GALBE (TOP); SVEN TORFINN, GALBE (ABOVE)

STAND IN AWE? YES.

FOLLOW IN FOOTSTEPS?

NOT RECOMMENDED.

At 2pm on May 12th, 2005, Ed Viesturs reached the summit of Annapurna, and completed the final stage of his 16-year journey to climb all 14 of the world's 8,000-meter mountains. Extraordinary enough, until you consider he did it all without supplemental oxygen. Congratulations, Ed. On being the only American to accomplish what you have. The world stands in awe. Albeit, cautiously.

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NEW YORK

Politics as Usual:

- **2005** Egypt: Constitutional amendment allows multiparty elections.
- **2004** Mali: In local elections considered free and fair, nearly 100 parties compete for 10,789 seats in 703 districts.
- **2002** Zimbabwe: Laws curtail speech, assembly, and association; criminalize publishing "false news."
- **2001** Eritrea: Government shuts down the entire independent press, imprisons journalists and activists.
- **1994** South Africa: Government ratifies a new constitution considered to be among the world's most democratic.

Ken Wiwa and his grandfather Chief Jim Wiwa pose with photos of Ken's father, Ken Saro-Wiwa. A leader of the Ogoni people, Saro-Wiwa was executed by the Nigerian government in 1995. Jim Wiwa died in April 2005.

Free Speech

Singing songs of freedom

In 1995 my father, Ken Saro-Wiwa, was killed by the Nigerian government. He was silenced for daring to expose a conspiracy: the collusion of a corrupt military regime and a giant multinational corporation to exploit a community's resources and despoil its environment. My father's story is the story of Africa.

When voices like his are silenced, others rise, and often they belong to musicians. Africa's musicians carry a sacred burden—they're the griots, the historians of Africa's rich, varied, and infinitely complex past. At once documentary makers and praise singers, they're our social critics and agony aunts. Their songs resonate with the unfulfilled longings of Africa's 900 million voices.

So much of the continent's recent history has been disfigured by brutal civil wars, dictators, and genocide. Amid the profound strife in some parts of the continent and the positive changes in others, the power of the people to determine their destinies waxes and wanes. Ghana and Benin have been experiencing stability and free elections in recent years, while in Zimbabwe and Eritrea, activists and journalists are being imprisoned or killed.

The political dysfunction has created a generation of Africans exiled from their homes and culture. If there is one musician who speaks for us, it's Geoffrey Oryema, who fled Uganda after his father's 1977 assassination. Popular in the West, Oryema and other African musicians living in exile are our modern griots, bringing our stories to the world.

—*Ken Wiwa*

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PHOTO BY PASCAL MAITRE

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A porter shoulders a hundred-pound bale of used clothes outside a warehouse in Kampala, Uganda.

The Shirt off Your Back

Free trade is clothing Africa in Western castoffs

It's a matter of supply and demand. Each American discards an average of ten pounds of apparel a year. Nonprofit charities like Goodwill sell their surplus of such clothing donations to for-profit exporters, and tons of the castoffs make their way to Africa. There, bales of the garments arrive in marketplaces where people who pay less than a dollar for a shirt and slightly more for trousers bargain for the "new" fashions.

In the past decade, as some African countries have reduced tariffs on used-clothing imports, previously worn goods have flooded into the continent and changed its appearance. Many Africans have traded colorful cotton prints or embroidered robes for Western clothes. They're willing to pay more for unique items—leather jackets, logo-bearing shirts—that they modify to reflect local tastes.

Across Africa labor unions complain that Western hand-me-downs are killing regional clothing industries. But experts blame factory shutdowns on poor management, political instability, and growing competition from inexpensive Asian clothes. A few countries have officially banned imports of used clothes, though illicit trade thrives. Some Ghanaians show support for their own clothing industry by wearing traditional textiles every Friday.

Today's main market for African apparel is abroad. Since 2000, preferential access to the American market has sent African clothing exports soaring. In the U.S. the products face competition not from used clothes but from a tougher rival: imports from China. —*Karen E. Lange*

- **Names for used clothes:** In Togo: dead white men's clothes; in Tanzania: *mitumba* (bale); in Liberia: *dokafleh* (loose translation, "try it on")
- **U.S. used-clothes exports to Africa:** $60 million in 2003
- **African textile and apparel exports to U.S.:** $1.6 billion in 2004, up 95 percent from 2001

MARCO LONGARI, GALBE

*Only available on Limited 4x4 model. †Available. Jeep and HEMI are registered trademarks of DaimlerChrysler Corporation.

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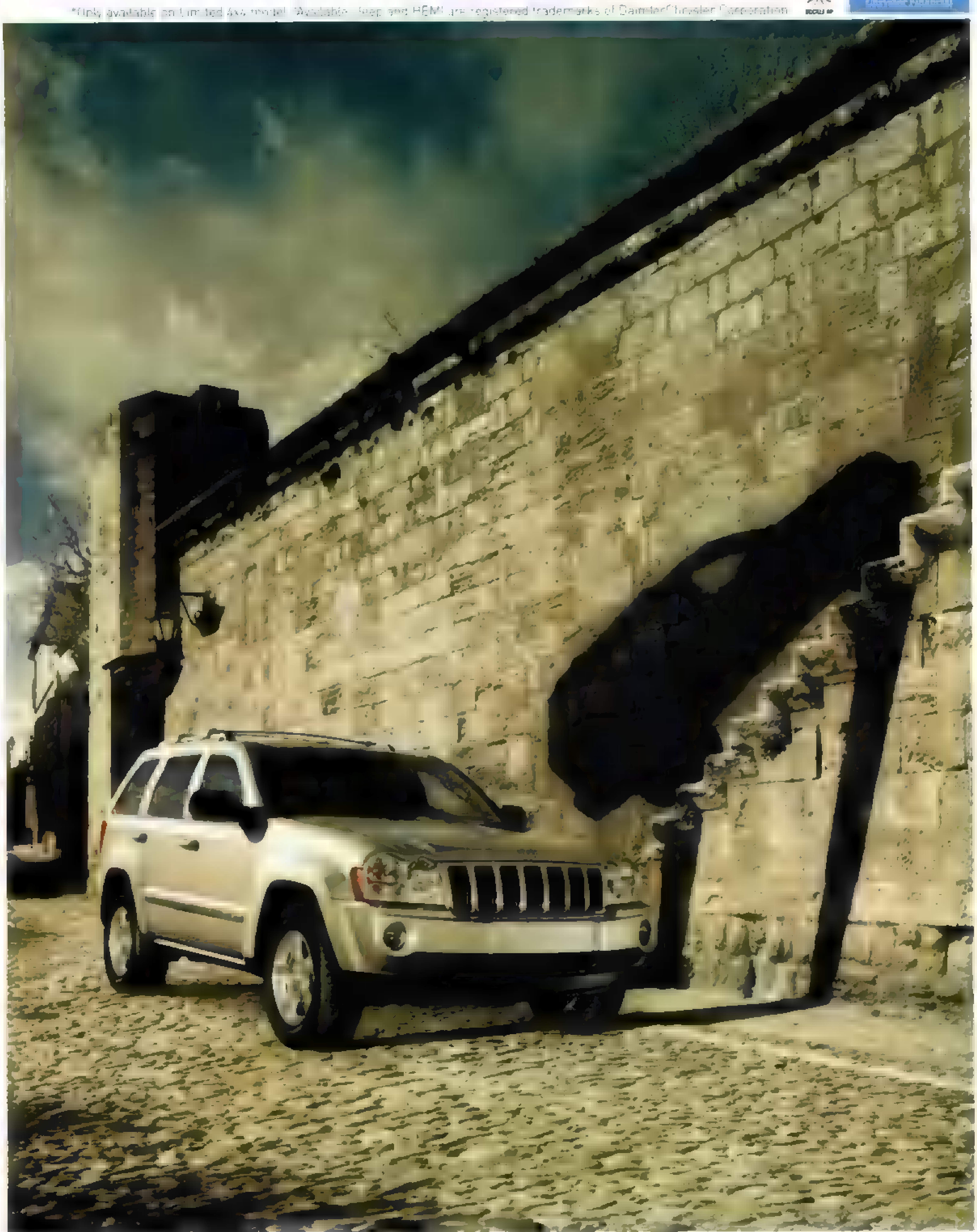

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- **South Africa's share of world gold production in 1980:** 55 percent
- **South Africa's share of world gold production in 2003:** 14.4 percent (though it is still the top producer)
- **Reduction in South Africa's entire gold mining workforce since 1990:** 60 percent
- **Total South African gold production in 2004:** 342 tons (lowest total since 1931)
- **Total fatalities of gold miners in South Africa in 2004:** 149

Migrants like Lesotho's Joe Moeketsi dig for South African gold at the TauTona mine.

Golden Jobs

Mine work lures migrants

The daily commute at TauTona gold mine near Johannesburg, South Africa, may not be a journey to the center of the Earth—but it's as close as it gets. Miners need two hours and three different elevators to reach the deepest level, 2.2 miles beneath the surface. At such depth geothermal heat cooks surrounding rock to 130°F, so workers pump chilled water onto the walls to make the temperatures bearable. Tunnel collapse is a constant threat. "This is the deepest mine in the world," says manager Fannie van Staden. "It's not a place to spend a holiday."

But for the gold miners, who come mostly from distant rural areas of South Africa or from industry-poor neighboring nations, these are prized steady jobs. The average pay at TauTona starts at about $7,300 a year—far more than a migrant could earn at home. AngloGold Ashanti, which runs the TauTona mine, estimates that 37 percent of its workforce in South Africa is foreign. Most have migrated from Lesotho, where unemployment now approaches 50 percent; others have left subsistence farming in Mozambique. South Africa's National Union of Mineworkers estimates that each miner's salary supports more than ten dependents back home.

According to the United Nations' International Labour Organization, 20 million workers in Africa, or 2 percent of the population, are currently international migrants. By 2015, one in ten Africans will be living and working outside his or her home country. —*Scott Elder*

GRAEME WILLIAMS, SOUTH PHOTOGRAPHS

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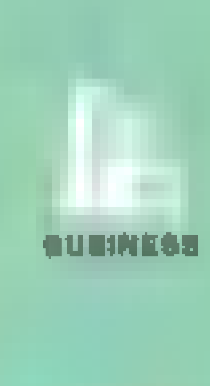

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A roadside vendor near Monrovia, Liberia, sells duiker haunches to a passing motorist.

Bush Meat

Appetite for wild animals is emptying Africa's forests

The carts arrive at market packed with meat—perhaps a catch of writhing crocodiles or stacks of monkey limbs. Shoppers seeking choice cuts bargain for the best prices. Most have no idea they're helping to exterminate the continent's wildlife.

Africa's trade in bush meat, meat from wild animals, is a multibillion-dollar business. Up to five million tons of bush meat are taken each year from central Africa's rain forests—much of it illegally. The result of this grim harvest may be empty forests, extinct animals, and, ultimately, hungry humans.

For some Africans, bush meat is their only source of protein; for others, hunting and selling the meat supplements meager incomes. City dwellers buy bush meat as a reminder of their heritage and because it confers social status.

Shrinking the demand will be difficult, but biologist Justin Brashares and others see hope. In Ghana, for example, Brashares found bush-meat consumption spiked when fish wasn't available or cost too much. Fish farming or cultivating cheap protein sources such as beans may reduce hunting. So would developing employment programs and enforcing hunting regulations. "This isn't a lawless land of animal killers," says Brashares. The bush-meat problem "is really about people who have few alternatives." —*Neil Shea*

- **Most common African bush meat:** antelope
- **Animals most at risk:** primates, elephants, hippos
- **Percent demand is expected to rise each year:** 2 to 4
- **Money a hunter can earn each year:** $400 to $1,100
- **Diseases linked to bush meat:** Ebola, HIV/AIDS
- **Western cities with significant bush-meat markets:** London, Paris, Toronto, New York, Washington, D.C.

For more information, go to *bushmeat.org*

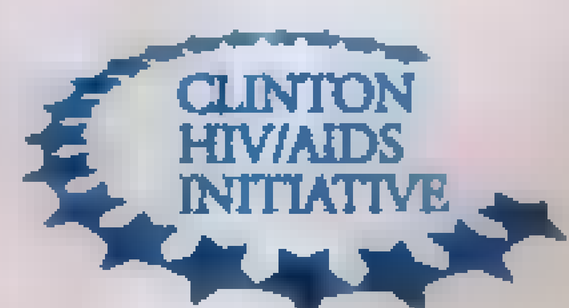
ELI REED, MAGNUM PHOTOS

Every day, 1,600 children die of HIV/AIDS ... their lives cut short.

12 million children have been **orphaned by HIV/AIDS** in sub-Saharan Africa alone—who will raise them?

Last year, 1 million African schoolchildren **lost their teachers** to HIV/AIDS[1]—who is going to teach these children?

Up to 20% of the nurses in South Africa are HIV positive[2]—**who will care for the children?**



BD

Partners in the battle against HIV/AIDS

Clockwise from far left: Johnny Weissmuller and Maureen O'Sullivan in the 1932 film *Tarzan the Ape Man*; LeVar Burton as Kunta Kinte in the 1977 TV miniseries *Roots*; Humphrey Bogart and Katherine Hepburn aboard the *African Queen*.

African Quiz

Test yourself on Africa's starring roles in film and fiction

1. In the **Tarzan** books by Edgar Rice Burroughs, where was the jungle the King of the Apes called home?

2. In ***Roots***, the book and TV miniseries by Alex Haley, where is Kunta Kinte from?

3. What river did Humphrey Bogart and Katherine Hepburn navigate in the movie ***The African Queen***?

4. The **Hotel Rwanda**, featured in a 2004 film of the same name, is in what city?

5. Where does Joseph Conrad's novel ***Heart of Darkness*** take place?

6. What is the setting for V. S. Naipaul's novel ***A Bend in the River***?

7. The film ***Black Hawk Down*** tells the story of a 1993 helicopter crash in what East African city?

8. **Karen Blixen,** who wrote under the name **Isak Dinesen,** had a farm in Africa. Where was it?

9. The film ***When We Were Kings*** chronicles a 1974 boxing match between Muhammad Ali and George Foreman that took place where?

10. ***Things Fall Apart,*** Chinua Achebe's 1958 novel, depicts traditional village life of what West African people?

11. **Ernest Hemingway**'s snows of Kilimanjaro fall in what country?

12. In the 1980 movie ***The Gods Must Be Crazy,*** where does the Coke bottle fall?

13. In what city does a man search for his missing son in Alan Paton's novel ***Cry, the Beloved Country***?

14. Where were **Elspeth Huxley**'s flame trees of Thika?

15. What country's struggle for independence is a theme of Barbara Kingsolver's novel ***The Poisonwood Bible***?

16. Where does **Sigourney Weaver (as Dian Fossey)** find gorillas in the mist?

17. In her book ***West With the Night*** where does Beryl Markham fly?

—*David Wooddell*

1 WEST AFRICA 2 JUFFEREE, GAMBIA 3 THE ULONGA-BORA RIVER IN GERMAN EAST AFRICA 4 KIGALI, RWANDA 5 ALONG THE CONGO RIVER 6 AN UNIDENTIFIED COUNTRY THAT CLOSELY RESEMBLES MOBUTU SESE SEKO'S ZAIRE 7 MOGADISHU, SOMALIA 8 OUTSIDE OF NAIROBI, KENYA 9 ZAIRE 10 THE IBO OF NIGERIA 11 TANZANIA 12 THE KALAHARI DESERT 13 JOHANNESBURG, SOUTH AFRICA 14 KENYA 15 BELGIAN CONGO 16 RWANDA 17 KENYA

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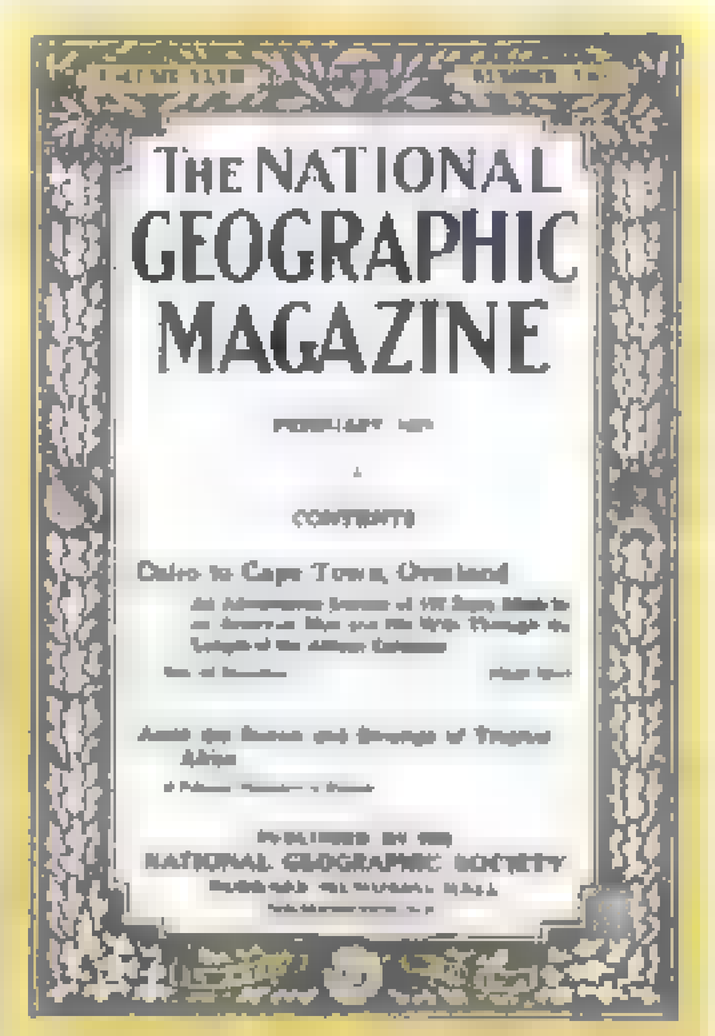

AFRICA

Cairo to Cape Town in 1925

The magazine's February 1925 issue was devoted solely to one article—an epic, 5,000-mile journey down the length of Africa by boat, train, and foot. At that time the American public was largely unfamiliar with Africa, and writer Felix Shay was hardly the impartial journalist of today. Much that he and his wife, Porter, encountered displeased them; much of the writing in his "Cairo to Cape Town, Overland," adapted in the following pages, reflects the era's cultural insensitivities. But he did shed light on what a lot of readers still thought of as the Dark Continent. He reported that "there are some 800 languages and dialects spoken" in Africa, and that in many areas "language and customs change with each 50 miles." Shay detailed some of those customs, and he described languages that went beyond the spoken ones. In Khartoum he wrote of the "sob and boom of the tom-toms lasting into the dawn," while "the long night out on the plains," he observed, was punctuated "with thousands of animals prowling about, the threatening noises, the silence, the vastness." —*Boris Weintraub*

Visit our online archive for more Africa stories. **ngm.com/africa**

ALFRED T. HART

South Africa's variant of the Hawaiian grass-skirt ballet costume: These masked native dancers are from Kentani, a district on the southeast coast of the Cape of Good Hope Province. The bleakness, dreariness of South Africa amazed us after the gorgeous luxuriance of the land farther north.

All captions adapted from the original February 1925 issue of NATIONAL GEOGRAPHIC.

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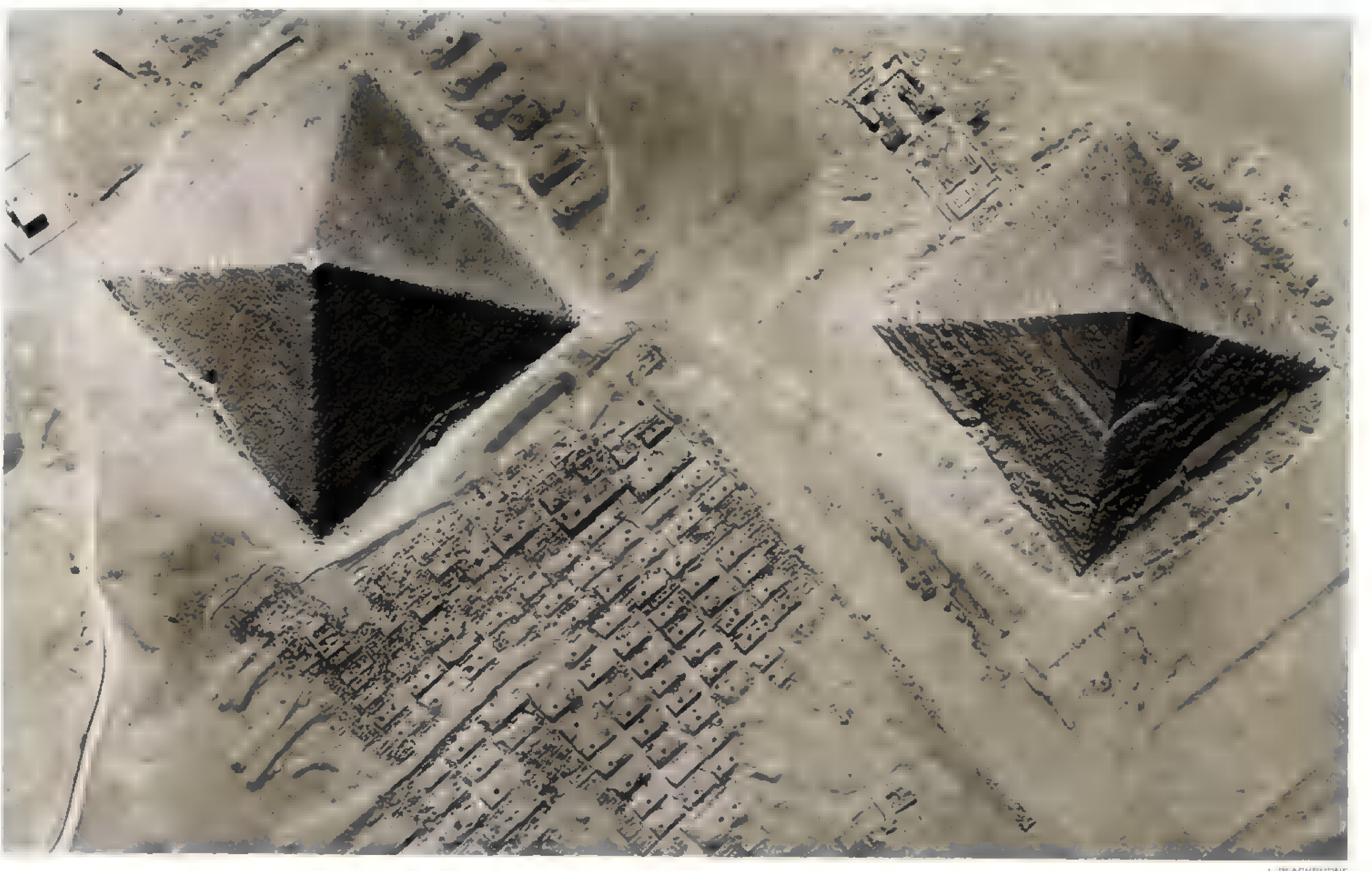

J. BLACKBURNE

The pyramids seen from an airplane: At left is the Great Pyramid, one of the seven wonders of the ancient world. Beside the second pyramid can be seen skeleton outlines of the mortuary temple from which a causeway led down the plateau to the Nile. Remains of the limestone cap on the second pyramid can be clearly seen. Tombs of nobles, commanders, and engineers attached to the court stretch in rows between the pyramids.

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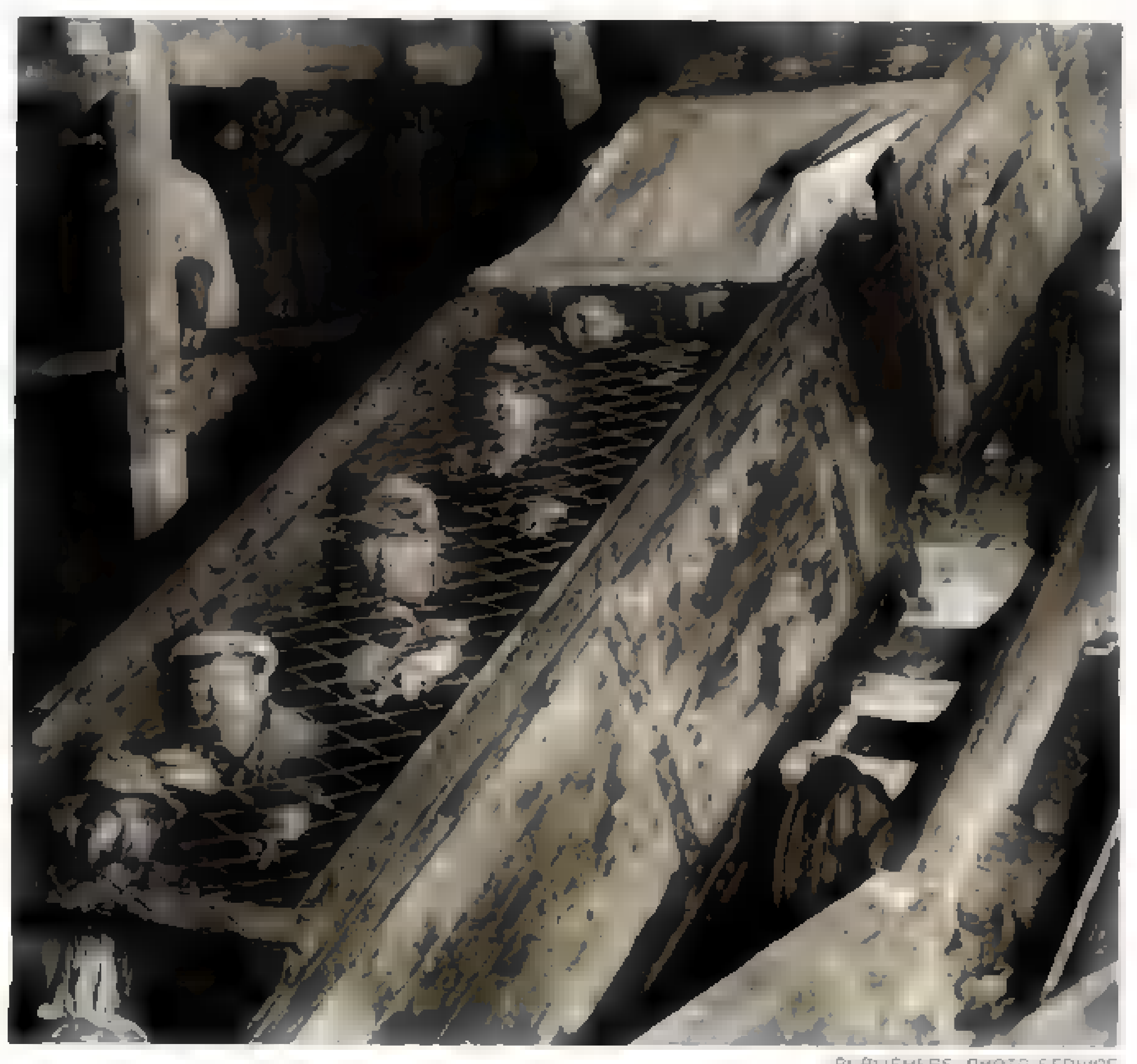
PUBLISHERS PHOTO SERVICE

A Wakamba family (above) makes its home in Kenya. Huts of tribes in Africa are practically always of beehive shape, but they differ in details. Inside is usually a collection of posts that serve not only as roof supports but also as uprights for partitions. The center may be devoted to one or two fireplaces. At left, a cage descends into a gold mine in South Africa. The wire screen over the cage is to protect the men from falling rocks.

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Among the superstitious African natives, a witch doctor, such as this member of the Shangani tribe in southern Rhodesia (Zimbabwe), is a person of great influence. During the tramp from Mwanza to Tabora in Tanganyika (Tanzania), a journey of 15 days on foot, the author, by entertaining his safari with tricks of magic, acquired a wide reputation as a witch doctor, and whole villages flocked to see him.

Windows to the New World

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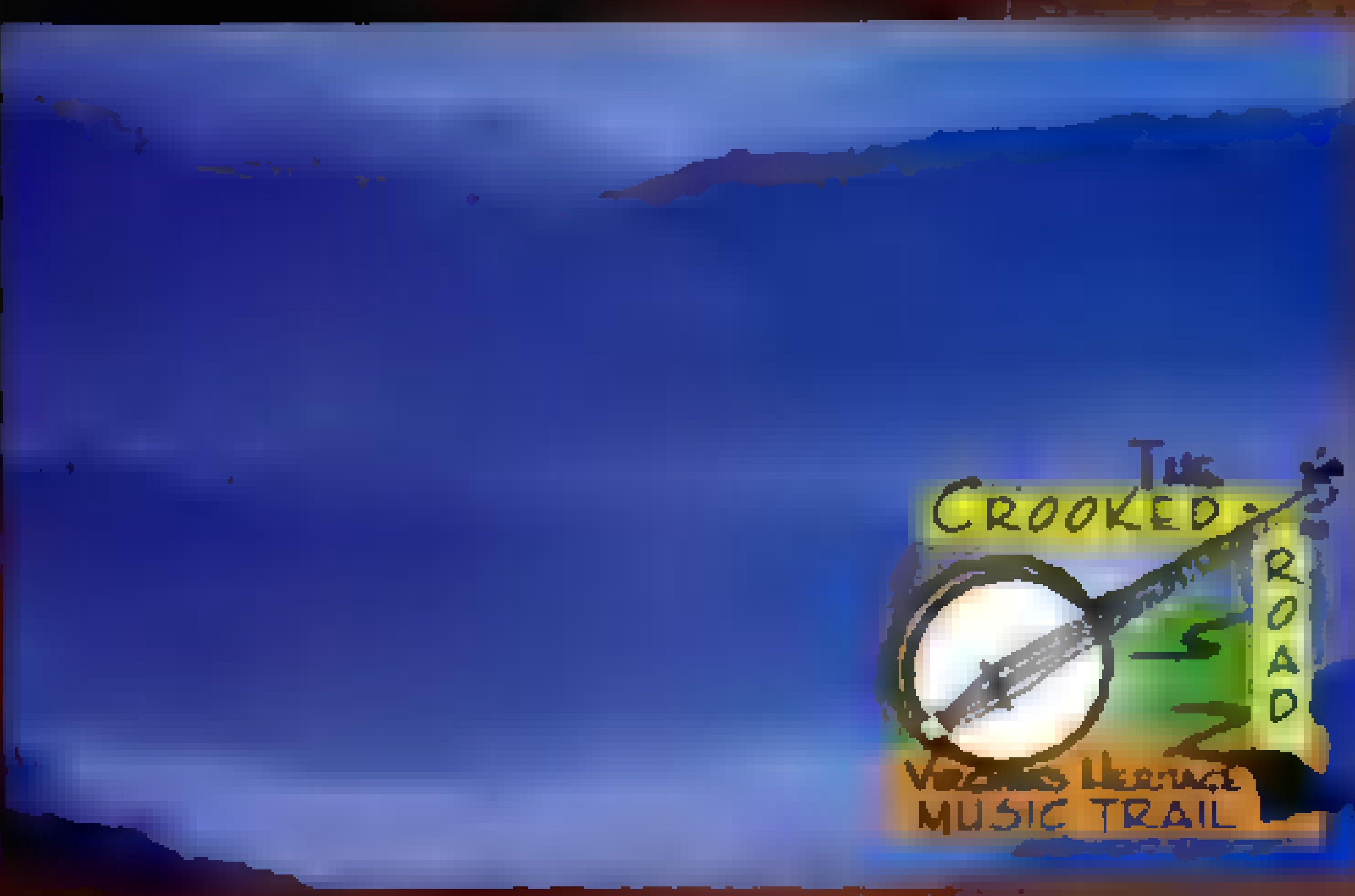

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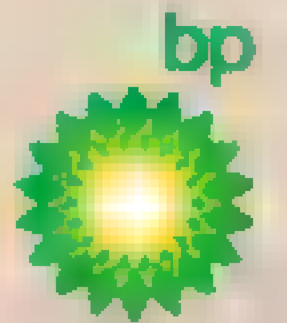

lenovo

My Seven

1 **Environment** Many issues we deal with at a national level are actually symptoms of larger problems. Instead of worrying about such symptoms, we should worry about the causes. As a professor in the University of Nairobi's faculty of veterinary medicine in the 1970s, I often went into the countryside. When it rained there, I'd see topsoil wash away. Then I'd hear rural women express need for firewood, clean water, and nutritious food. I realized these things were all connected. Kenya's indigenous forests had been turned into plantations. Our country was so hungry for cash crops that too much vegetation had been removed to farm them. Degradation of land was widespread.

2 **Empowerment** At a National Council of Women of Kenya forum I suggested we engage women in tree planting to solve these problems, since trees provide wood and food, and stop soil erosion. We later had resistance from the government then in power. We understood that its members fought us not because we'd planted trees but because we had organized and challenged the mismanagement of the environment.

Wangari Maathai

Nobel Peace Prize laureate

She began a tree-planting campaign in 1977 to help reforest her native Kenya and provide jobs. But something bigger grew. Her Green Belt Movement is now an environmental and political force that has inspired the world. Once considered a dissident, Maathai now works from within the government: She received 98 percent of the vote to win a seat in Kenya's Parliament, and she's also the nation's assistant minister for the environment. "Protecting the global environment is directly related to securing peace," she said after winning the Nobel Peace Prize in 2004. These seven areas of concern address her history—and her hopes for the future.

DAVID ALAN HARVEY

3 **Education** When people are educated to the links between environment and government, they can improve both. Through civic and environmental education programs, they lose their apathy and get involved.

4 **Good government** Without a government that is respectful of people's rights, the environment will gradually be destroyed by privatization of public lands. In Kenya we changed the system we struggled with for so many years and are now proud to have a more democratic government.

5 **Sustainable development** Environmental needs must be taken into account. If we manage resources more responsibly and share them more equitably, many conflicts over them will be reduced.

6 **Employment** People need opportunities and resources in the places they live. Otherwise many migrate to big cities seeking jobs that are not there. Kenya's solutions to this problem include allocating funds for rural areas to help address poverty and give young people the skills they need to be competitive in the job market.

7 **The future** As we work to create a world that honors and rewards women, we look to our daughters and think of the future. I hope that daughters, not only in Africa but all over the world, will be inspired and know that if they are committed and patient, they can achieve something worthwhile.

MAATHAI SPEAKS her mind. To hear an interview with the Nobel laureate go to the *Nairobi* story in Features at **ngm.com/africa.**

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NAIROBI

Bright Lights, Huge City

Illuminating Kenya's capital

Barely into his first day of photographing the Nairobi story, **David Alan Harvey**'s strobe light battery completely blew its circuits. "I needed this big light for all the portrait shots, but I knew there were no batteries like it in Kenya," he recalls.

Don't worry, said Peter Gachanja, whom David had hired as an assistant. A resident of Kibera, Nairobi's largest slum, Peter disappeared into its labyrinth. Less than half an hour later he was back with the battery fixed. "The guy who fixed it probably hadn't seen a strobe light battery before," David says, "But in places like Kibera, people know how to fix things. They have to. It was just another battery."

David valued Peter's savvy when negotiating Nairobi's dangerous neighborhoods, but Peter also quickly learned the technical and creative sides of lighting, becoming a vital artistic asset on the shoot. Says David, "I counted on him for everything."

GNMENT

At a Nairobi restaurant David Alan Harvey, far left, sits [illegible] as Peter Gachanja illuminates writers Binyavanga Wainaina and Charlie Cobb, below.

PHOTO BY BOBBY MODEL

WORLDWIDE

Alexandra Fuller plays mancala with charcoal sellers in Zambia.

ZAMBIA

"I've seen mancala played all my life," says writer **Alexandra Fuller.** Growing up in Zambia and Malawi, she recalls, "there was a board outside every tavern and beer hall, and there were hole-in-the-ground boards set up under every tree where people wait."

Mancala is an ancient game of strategy in which two players try to gather as many pieces as they can from a board comprising rows of cups—or scooped-out earth. Alexandra says she elbowed her way into the round above. "I won," she adds, "but I was getting heaps of unsolicited help from the bystanders who just wanted to see their pal defeated by an outsider woman!"

AIDS IN AFRICA

"I didn't want this to be a story about death," says photographer **Gideon Mendel.** "I really wanted this to be a story about recovery." One teenage girl he photographed was supposed to be a symbol of hope, living proof that antiretroviral drug therapy can succeed even in the world's poorest communities.

His initial photos show her emaciated body—the kind of pictures he tends not to take because they're images of victims. "But this felt different," he wrote in his journal. "This was a beginning—I wasn't photographing an AIDS skeleton that was dying. She is someone who will hopefully do well on the treatment. I have this vision of her in three months' time when she'll be feeling better and walking around, and another image of her six months later, a normal teenage girl going back to school." But the girl died before he saw her again, of complications from diarrhea. "I was devastated," Gideon says. "If she'd gotten to the hospital one day earlier, she might have lived."

MEGAFLYOVER

Flying in a plane over Africa would seem like a relatively safe assignment for conservationist **Mike Fay.** His work on land took him through Ebola-ridden pockets of jungle and got him gored by an elephant. But even 500 feet in the air, danger finds him. This time his plane almost ran out of oil over the Cape of Good Hope. Mike and his pilot landed "maybe one or two minutes before the plane would have gone down." What's odd about piloting, says Mike, who once crashed in Gabon, "is that right to the end you're just managing, so you're not scared. You just know you're going to die."

ITURI PYGMIES

Photographer **Randy Olson** needed a fresh shirt. He'd spent several days taking pictures of the Mbuti, a group of semi-nomadic Pygmies living in the Democratic Republic of the Congo's Ituri rain forest. "I made the mistake of taking my shirt off in the middle of camp," says Olson. The sight of his bare torso caused almost all of the 70 Pygmies present to scream with laughter.

While the Mbuti have survived loggers, gold miners, and marauding militias, many of them haven't had much experience with light-skinned people—at least none as pale as Olson. "I've had some really difficult assignments, but this one was just pleasant," he says. "Pygmies are a lot happier than most people I know."

Randy Olson poses with a few friends in the Ituri rain forest.

TALES FROM THE FIELD Get more stories from our contributors, including their best, worst, and quirkiest experiences, in Features at **ngm.com/africa.**

LYNN JOHNSON (TOP); RAYMOND PALUKU TSONGO

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*Individual results may vary.

gsk

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PATIENT INFORMATION – Rx only

AVANDIA® (ah-VAN-dee-a)

Rosiglitazone Maleate Tablets

Read the Patient Information that comes with AVANDIA before you start taking the medicine and each time you get a refill. There may be new information. This information does not take the place of talking with your doctor about your medical condition or your treatment. If you have any questions about AVANDIA, ask your doctor or pharmacist.

What is AVANDIA?

AVANDIA is a prescription medicine used with diet and exercise to treat type 2 ("adult-onset" or "non-insulin dependent") diabetes mellitus ("high blood sugar"). AVANDIA may be used alone or with other anti-diabetic medicines. AVANDIA can help your body respond better to insulin made in your body. AVANDIA does not cause your body to make more insulin.

Before you take AVANDIA you should first try to control your diabetes by diet, weight loss, and exercise. In order for AVANDIA to work best, it is very important to exercise, lose excess weight, and follow the diet recommended for your diabetes.

The safety and efficacy of AVANDIA have not been established in children under 18 years of age.

What Is Type 2 Diabetes?

Type 2 diabetes happens when a person does not make enough insulin or does not respond normally to the insulin their body makes. When this happens, sugar (glucose) builds up in the blood. This can lead to serious medical problems including kidney damage, heart disease, loss of limbs, and blindness. The main goal of treating diabetes is to lower your blood sugar to a normal level. Lowering and controlling blood sugar may help prevent or delay complications of diabetes such as heart disease, kidney disease or blindness. High blood sugar can be lowered by diet and exercise, by certain medicines taken by mouth, and by insulin shots.

Who should not take AVANDIA?

Do not take AVANDIA if you are allergic to any of the ingredients in AVANDIA. The active ingredient is rosiglitazone maleate. See the end of this leaflet for a list of all the ingredients in AVANDIA.

Before taking AVANDIA, tell your doctor about all your medical conditions, including if you:

- have heart problems or heart failure. AVANDIA can cause your body to keep extra fluid (fluid retention), which leads to swelling and weight gain. Extra body fluid can make some heart problems worse or lead to heart failure.
- have type 1 ("juvenile") diabetes or had diabetic ketoacidosis. These conditions should be treated with insulin.
- have liver problems. Your doctor should do blood tests to check your liver before you start taking AVANDIA and during treatment as needed.
- had liver problems while taking REZULIN® (troglitazone), another medicine for diabetes.
- are pregnant or trying to become pregnant. It is not known if AVANDIA can harm your unborn baby. You and your doctor should talk about the best way to control your high blood sugar during pregnancy.
- are a premenopausal woman (before the "change of life") who does not have regular monthly periods. AVANDIA may increase your chances of becoming pregnant. Talk to your doctor about birth control choices while taking AVANDIA.
- are breastfeeding. It is not known if AVANDIA passes into breast milk. You should not use AVANDIA while breastfeeding.
- are taking prescription or non-prescription medicines, vitamins or herbal supplements. AVANDIA and certain other medicines can affect each other and lead to serious side effects including high blood sugar or low blood sugar. Keep a list of all the medicines you take. Show this list to your doctor and pharmacist before you start a new medicine. They will tell you if it is okay to take AVANDIA with other medicines.

How should I take AVANDIA?

- Take AVANDIA exactly as prescribed. Your doctor will tell you how many tablets to take and how often. The usual daily starting dose is 4 mg a day taken once a day or 2 mg taken twice a day. Your doctor may need to adjust your dose until your blood sugar is better controlled.
- AVANDIA may be prescribed alone or with other anti-diabetic medicines. This will depend on how well your blood sugar is controlled.
- Take AVANDIA with or without food.
- It can take 2 weeks for AVANDIA to start lowering blood sugar. It may take 2 to 3 months to see the full effect on your blood sugar level.
- If you miss a dose of AVANDIA, take your pill as soon as you remember, unless it is time to take your next dose. Take your next dose at the usual time. Do not take a double dose to make up for a missed dose.
- If you take too much AVANDIA, call your doctor or poison control center right away.
- Test your blood sugar regularly as your doctor tells you.
- Diet and exercise can help your body use its blood sugar better. It is impor to stay on your recommended diet, lose excess weight, and get reg exercise while taking AVANDIA.
- Your doctor should do blood tests to check your liver before you start AVANI and during treatment as needed. Your doctor should also do regular bl sugar tests (for example, "A1C") to monitor your response to AVANDIA.

What are possible side effects of AVANDIA?

- heart failure. AVANDIA can cause your body to keep extra fluid (f retention), which leads to swelling and weight gain. Extra body fluid can m some heart problems worse or lead to heart failure.
- swelling (edema) from fluid retention. Call your doctor right away if you h symptoms such as:
  - swelling or fluid retention, especially in the ankles or legs
  - shortness of breath or trouble breathing, especially when you lie do
  - an unusually fast increase in weight
  - unusual tiredness
- low blood sugar (hypoglycemia). Lightheadedness, dizziness, shakin or hunger may mean that your blood sugar is too low. This can happen if skip meals, if you use another medicine that lowers blood sugar, or if you h certain medical problems. Call your doctor if low blood sugar levels ar problem for you.
- weight gain. AVANDIA can cause weight gain that may be due to f retention or extra body fat. Weight gain can be a serious problem for pe with certain conditions including heart problems. Call your doctor if you h an unusually fast increase in weight.
- low red blood cell count (anemia).
- ovulation (release of egg from an ovary in a woman) leading to pregnar Ovulation may happen in premenopausal women who do not have regu monthly periods. This can increase the chance of pregnancy.
- liver problems. It is important for your liver to be working normally when take AVANDIA. Your doctor should do blood tests to check your liver bef you start taking AVANDIA and during treatment as needed. Call your doc right away if you have unexplained symptoms such as:
  - nausea or vomiting
  - stomach pain
  - unusual or unexplained tiredness
  - loss of appetite
  - dark urine
  - yellowing of your skin or the whites of your eyes

The most common side effects of AVANDIA included cold-like symptor injury, and headache.

How should I store AVANDIA?

- Store AVANDIA at room temperature, 59° to 86° F (15° to 30° C). Keep AVANE in the container it comes in.
- Safely, throw away AVANDIA that is out of date or no longer needed.
- Keep AVANDIA and all medicines out of the reach of children.

General Information about AVANDIA

Medicines are sometimes prescribed for conditions that are not mentioned patient information leaflets. Do not use AVANDIA for a condition for which it w not prescribed. Do not give AVANDIA to other people, even if they have t same symptoms you have. It may harm them.

This leaflet summarizes important information about AVANDIA. If you would l more information, talk with your doctor. You can ask your doctor or pharmac for information about AVANDIA that is written for healthcare professionals. Y can also find out more about AVANDIA by calling 1-888-825-5249 or visiting t website www.avandia.com.

What are the ingredients in AVANDIA?

Active Ingredient: rosiglitazone maleate

Inactive Ingredients: hypromellose 2910, lactose monohydrate, magnesiu stearate, microcrystalline cellulose, polyethylene glycol 3000, sodium star glycolate, titanium dioxide, triacetin, and 1 *or more of the following: synthe* red and yellow iron oxides and talc.

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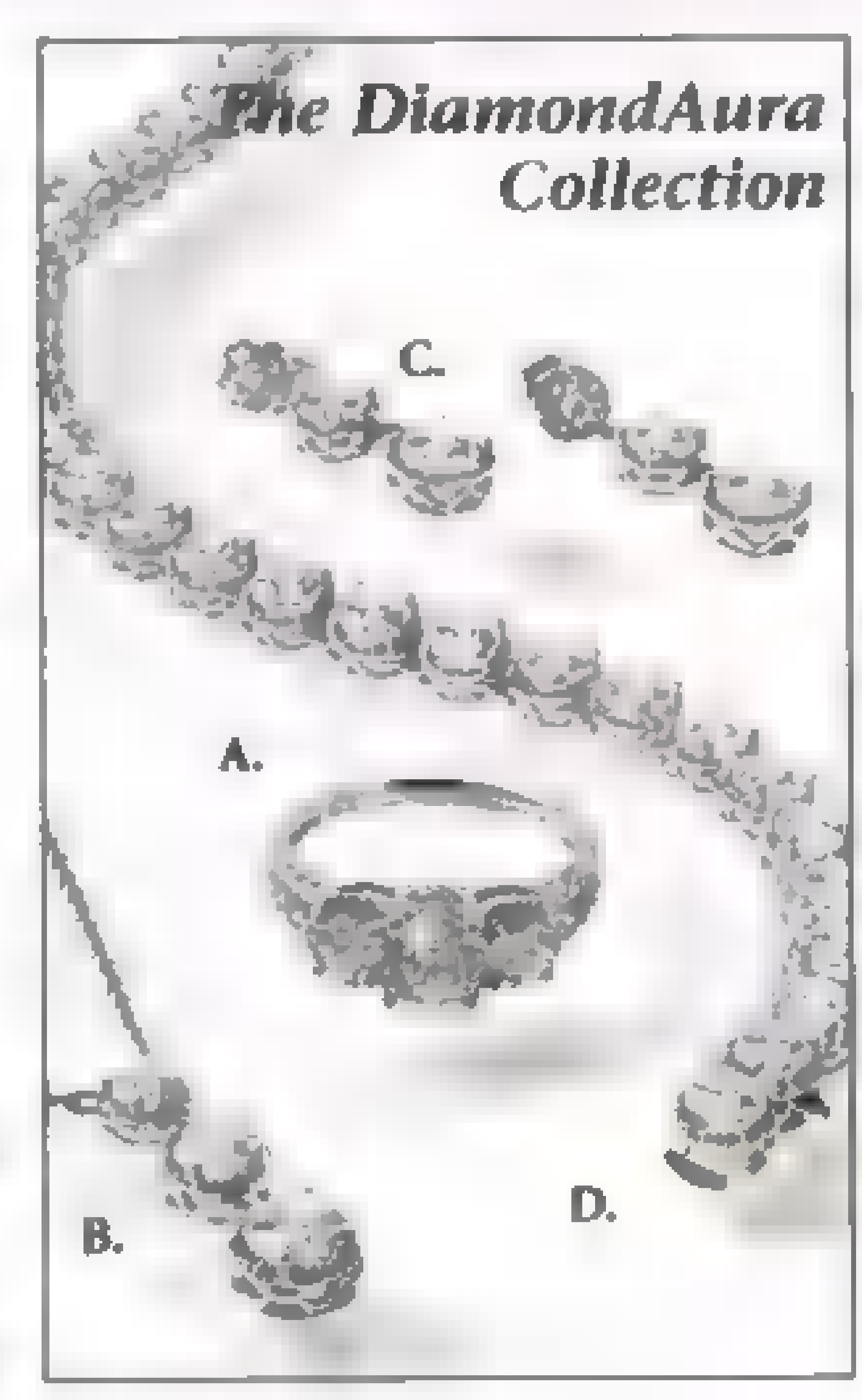
There is little doubt that a natural mined diamond of top quality is one of the world's most magnificent gems. It is much coveted for its exquisite beauty, but the simple truth is that diamonds are simply compressed crystallized carbon. The laboratories at Diamond*Aura* were created with one mission in mind: *Design classic jewelry with the scientifically perfect gemstones at a cost that lets everyone experience a stone with more fire and brilliance than a mined diamond.*



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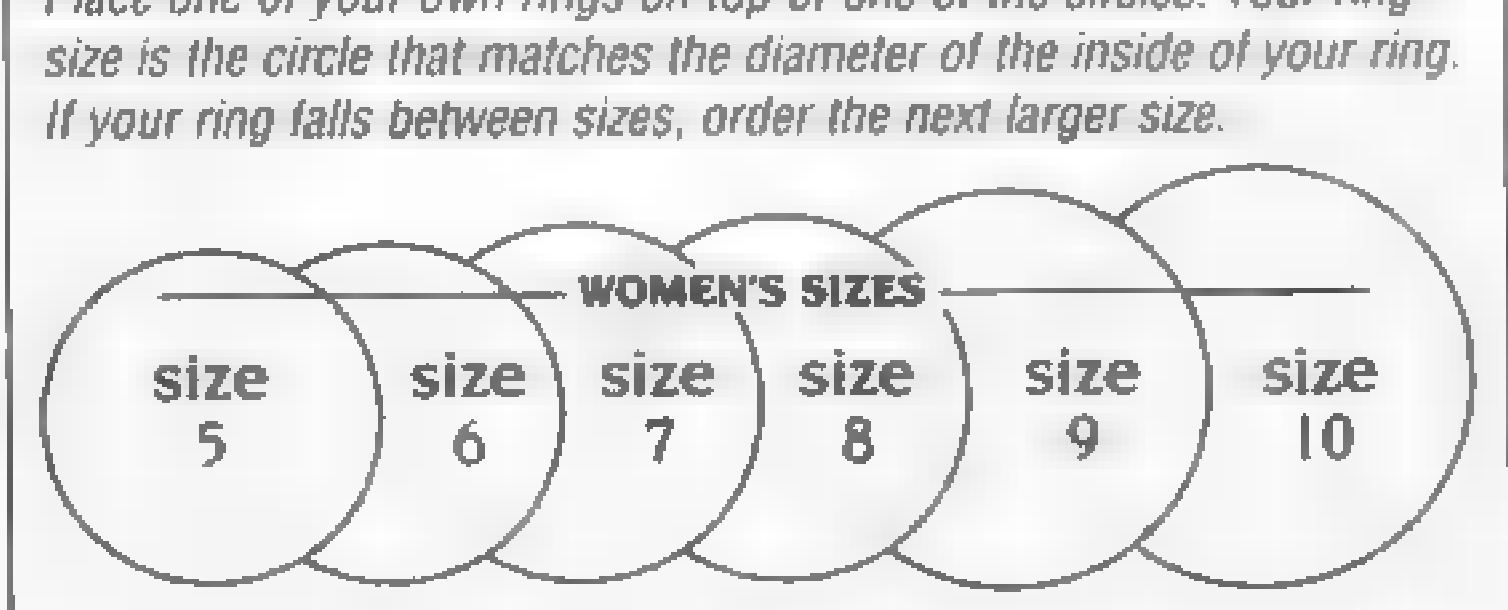

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Who Knew?

PALEOANTHROPOLOGY

Out of Africa

Are we looking for bones in all the right places?

Scientists are good at finding logical patterns and turning data into a coherent narrative. But the study of human origins is tricky: The bones tell a complicated story. The cast of characters keeps growing. The plot keeps thickening. It's a heck of a tale, still unfolding.

More than half a century ago the great biologist Ernst Mayr surveyed the field of paleoanthropology and saw all sorts of diverse characters: Peking man, Java man, and *Homo erectus*. He figured out that they were all the same thing and helped bring coherence to a rambling tale. By the 1960s the textbook version of human origins looked pretty tidy: Humans evolved in Africa; *Homo habilis* begat *Homo erectus*, who begat *Homo sapiens*. (The Neandertals were sort of a fly in the ointment.)

Today the field has again become a rather glorious mess. The central fact of human evolution is a given—humans descended from a primate that lived in Africa six or seven million years ago—and those who would doubt evolution are arguing against the entire enterprise of science. But even though the basics are established, some key details are still unknown.

"Our family tree is no different from that of any other animal. There are a lot of dead ends in it. At certain times you had three, perhaps four species of hominins," says Hans Sues, a paleontologist at the National Museum of Natural History in Washington, D.C.

The fossil record is hampered by the fact that bones don't fossilize everywhere. We have essentially no fossils, for example, of chimpanzees, because they live in rain forests, where bones decompose rapidly. "We're missing a whole swath of habitat," says Dan Lieberman, a Harvard paleoanthropologist.

Lieberman says that it's time for a new Mayr to come along and figure out what it all means. Lieberman thinks some of his colleagues have tried too hard to tell the story of human origins from a relatively limited set of fossils, particularly those found in the Rift Valley of East Africa.

"We're not doing a very good job of being honest about what we don't know," says Lieberman. "Sometimes I think we're trying to squeeze too much blood out of these stones."

Lieberman's suggestion raises hackles. Tim White, a paleoanthropologist at the University of California at Berkeley who works in East Africa, says: "People who look for fossils focus on the places with the highest potential. If Lieberman or Sues have good ideas for where others should be looking, why don't they share them?"

Earth doesn't yield a perfect database. Still, it's our scientific impulse to impose parsimonious explanations on complex problems in the same way that Newton realized that the fall of the apple and the motion of the planets were governed by the same simple force called gravity. But the process of evolution can't be observed like the fall of an apple. Life—despite all the efforts of modern science—is messy.

—*Joel Achenbach*
WASHINGTON POST STAFF WRITER

WEBSITE EXCLUSIVE For more about human origins, and for links to Joel Achenbach's work, go to Departments at ngm.com/africa.

PHOTO ILLUSTRATION BY CARY WOLINSKY

Afri

Giant dunes sprawl across the Namib, possibly the oldest desert on Earth.

PHOTO BY GEORGE STEINMETZ

THIS IS THE PLACE WHERE, TWO AND A HALF MILLION YEARS AGO, HUMANS AND ANIMALS FIRST CONVERGED, SHARING SOME OF EARTH'S MOST SPECTACULAR GROUND. TODAY, WITH COMPETITION FOR RESOURCES ON THE RISE, CONVERGENCE HAS BECOME COLLISION, FUELING WAR, DISEASE, AND EXTINCTION. YET DESPITE SUCH CALAMITIES, AFRICA IS ALIVE WITH STORIES OF RENEWAL. IN THIS ISSUE WE EXPLORE HOW THE CONTINENT EMBODIES THE CHALLENGE FACING HUMANKIND: HOW TO SURVIVE, AND MAKE A BETTER LIFE FOR OURSELVES, WHILE SUSTAINING A BALANCE WITH NATURE.

THE WILD LIFE

It's the image of Africa that enthralls the world—a wilderness untamed—captured in the eyes of lions crossing a stream in Botswana. Africa's premier species—lions, elephants, and gorillas, among others—draw in tourist dollars but often compete with farmers for land, water, and food, leaving the animals' future far from certain.

▶ Download as wallpaper at ngm.com/africa.

BEVERLY JOUBERT

AS CITIES SPREAD

Rusty roofs hide the despair of Nairobi's Kibera slum, a maze of shacks and open sewers where some 800,000 people live. Driven by drought, war, or dreams of a better life, Africa's rural poor are flocking to such slums. The continent's population is expected to more than double by mid-century, mostly in urban areas.

GEORGE STEINMETZ

CULTURAL ROOTS

Coming of age in an age of violence, a Bantu boy gagged for silence, dances with Mbuti Pygmies during a five-month rite of manhood in a remote corner of war-ravaged Democratic Republic of the Congo. The tradition bonds village-dwelling Bantus to the nomadic Mbuti as their worlds move uneasily into the new century.

RANDY OLSON

SCARCE SOILS
Terraced crops climb the slopes of the Virunga Mountains in Rwanda, continental Africa's most densely populated nation. Nearly every speck of arable land is taken, so people push into protected forests—and each other. Land scarcity contributed, in a small way, to Rwanda's genocide in 1994 and still stirs conflict elsewhere.

GEORGE STEINMETZ

RACE FOR RESOURCES *Gas flares from an oil rig off the coast of Nigeria, where villagers have repeatedly taken to the sea to protest the drilling. Hundreds of billions of dollars' worth of oil has poured out of Nigeria, though little of that money has reached residents. Africa's rich deposits of diamonds, gold, and oil have often proved a curse, fostering corruption, coups, and civil wars.*

ED KASHI

THE NEW AFRICA

At a Nairobi restaurant, 23-year-old lawyer Khadija Hassan Kanyare stands ready to make a difference. "My grandparents had to put up with colonialism," says Hassan Kanyare. "Now we have to put up with dictators who bully and berate people who have nothing. Hopefully, my generation can do something about it."

DAVID ALAN HARVEY

Tracing the Human Foot

JUST NORTH of the old caravan town of Agadez, in central Niger, stretches the Aïr Massif, a vast range of cinder gray highlands standing up from the Sahara like a coal barge afloat on an ocean of cream. The peaks and plateaus of the Aïr have been shaped over time from a complicated mixture of rock types—including magmatic ring dikes, granitic intrusions, Paleozoic sandstone, and recent flows of lava—but the overall impression they convey can be captured without geologic jargon: big mountains, arid and dark and steep. Their gulches (*koris*, in the local terminology) are water carved but, in dry season, brim only with sand. Old hoof trails, scratched across high ledges, suggest that once this was good habitat for Barbary sheep, *Ammotragus lervia*, a hardy species now extinct or endangered across most of its North African range. Maybe the habitat is still good, but the sheep seem to have been hunted out. There are no paved roads and few settlements amid these mountains. Apart from four-by-four tracks up the larger koris, the main signs of human presence are igloo-like rock piles sparsely polka-dotting the foothills. Each dot is an ancient grave. The graves are remote, inconspicuous, mostly unopened by pillagers, and best seen from a low-flying plane. That's how J. Michael Fay sees them, on a mild December morning, as an heirloom Cessna 182 carrying him and three others approaches the northeastern edge of the massif.

The Cessna, showing call letters G-OWCS, is painted scarlet and specially equipped for collecting data. The call letters honor Fay's employer, the Wildlife Conservation Society (WCS), which has supported his varied African labors for 20 years. The plane looks like a toy, or an enameled piñata, but it bears serious purposes, not candy. With a young Austrian pilot named Mario Scherer at the controls, and Fay in the right seat amid a rat's nest of custom-rigged digital hardware and cables, it caresses the topography, circling here, dipping a wing there, rising nervily through high notches to put peaks close at eye level on each side. Mounted in its right door is a high-resolution digital camera that, automatically every 20 seconds, takes a vertical shot of the ground. The photos, each tagged with GPS data registering exact time, latitude, longitude, and altitude, are uploaded into a Hewlett-Packard Tablet computer on Fay's lap, through which he can add notes. A similar Tablet, scrolling out a map along the plane's flight line, rests under his left elbow. There is no in-flight movie. Fay's attention flicks constantly, tirelessly, between the computer screens and the terrain passing below.

SOCIETY GRANT

This Expeditions Council project was supported by your Society membership.

CAN 92,000 AERIAL PHOTOGRAPHS AND A BLIZZARD OF COMPUTERIZED DATA YIELD A REPORT THAT WILL HELP PROTECT AFRICA'S WILD SPACES?

BY DAVID QUAMMEN | PHOTOGRAPHS BY GEORGE STEINMETZ

He wears headphones and a scruffy gray beard.

The plane's interior is as spacious as a Volkswagen bug. Behind the two seats is an 80-liter auxiliary gas tank, like a riser of welded aluminum, useful for long flights over jungle or desert and as a bum-rest for anyone rash enough to crawl aboard as a passenger. Jammed beside me on this fool's bench sits a man named Maurice Ascani, small but excitable, claiming little space for his buttocks but much for his personality.

Ascani is a French-born Nigerien with a blunt manner, a deep commitment to Niger's wildlife, and a strong resemblance to the actor Roy Scheider. He serves as communications officer of a local conservation group called SOS Faune du Niger. Having traveled the country's Saharan outback for more than 30 years, taking photographs, making friends among the desert tribes, observing the fauna, watching some of the most magnificent species (such as the Barbary sheep and a big spiral-horned antelope, the addax) suffer decline, he is well qualified for his role this week as Fay's expert local guide and collaborator. Experience hasn't jaded Ascani. He cranes at his window to ogle the mountains as though glimpsing them for the first time. Occasionally he elbows me to appreciate something—"*Voyez!*"—on his side, or he lurches forward to holler advice at the pilot. One difference between him and us three, besides his disinclination to sit still, is that Ascani knows what to expect as the Cessna nears a certain point known as Arakao.

That point lies at latitude 18° 55′ N, longitude 9° 34′ E. My map shows it merely as a small floating label along the east face of the mountains, but Ascani has seen the place firsthand. He has been on the ground at Arakao. He has shot some dramatic images. If he shifts with anticipation as we draw close, I fail to notice, shifting my own sore rump on the aluminum tank.

Then suddenly we're there. Looking eastward toward the open desert, we see an amazing spectacle: dunes, towering dunes, piled up along the massif's eastern face, like a herd of khaki dinosaurs stopped by a giant stone wall.

SET IN STARK OPPOSITION to the dark peaks of Aïr, these are mountains of a much different sort—granular, graceful, silky textured, shaded gently in tones of tan and pale salmon, erected and sculpted into pyramid peaks and razor-edge ridges, swaybacks and rippling slopes, by the winds that have blown them in, grain by grain, across 150 flat miles from northeastern Niger. Arakao, it turns out, is nothing more than a name for the spot to which those winds deliver their cargo, almost as though they're whistling down a tunnel. Hitting the mountains at a very particular point—the partial cone of an ancient volcano—they swirl, scatter, and lose hold. The

Africa by Air

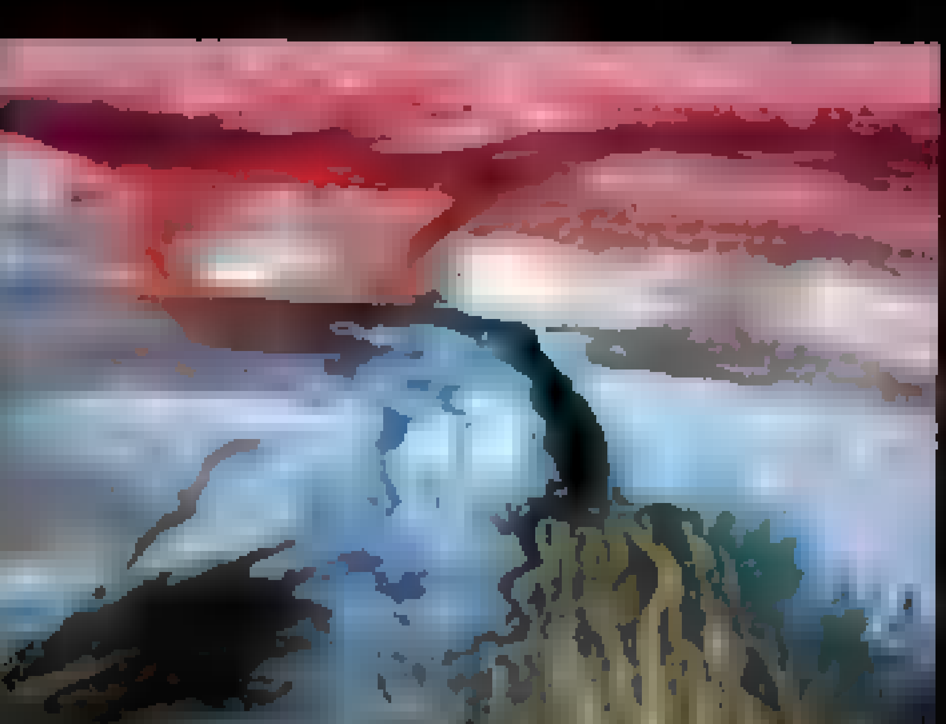
June [illegible], 2004: Biologist J. Michael Fay lifts off from Pretoria, South Africa, in a modified Cessna 182 (below, over the Namib Desert) with a pilot, cameras, computerized maps, a global positioning system—and a will of steel. Flying low and slow over the continent's diverse ecosystems (his route, at right), he compiled a visual record of Africa's environment, from the most densely packed places to the wildest. Six months, 10,000 gallons of gas, and 21 countries later, Fay touched down in Portugal with more than 92,000 photographs (nine are below) and a laptop full of data—hard-won material he hopes will inspire a long-term plan to preserve Africa's natural riches.

▶ Follow his journey at ngm.com/megaflyover.

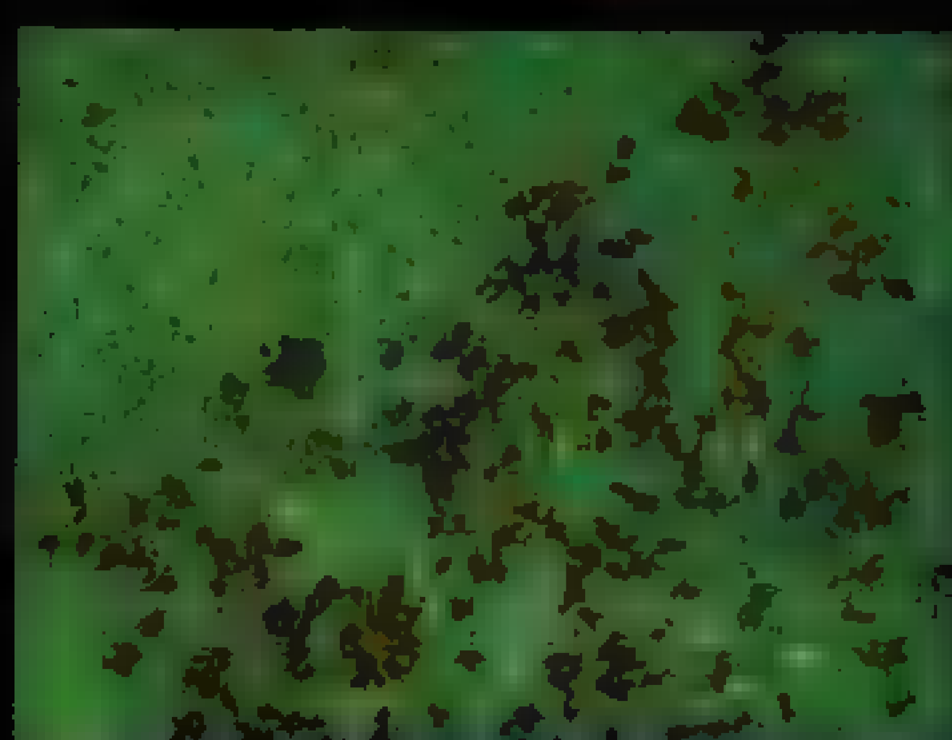
NAMIB DESERT 1

DIRKOU, NIGER 2

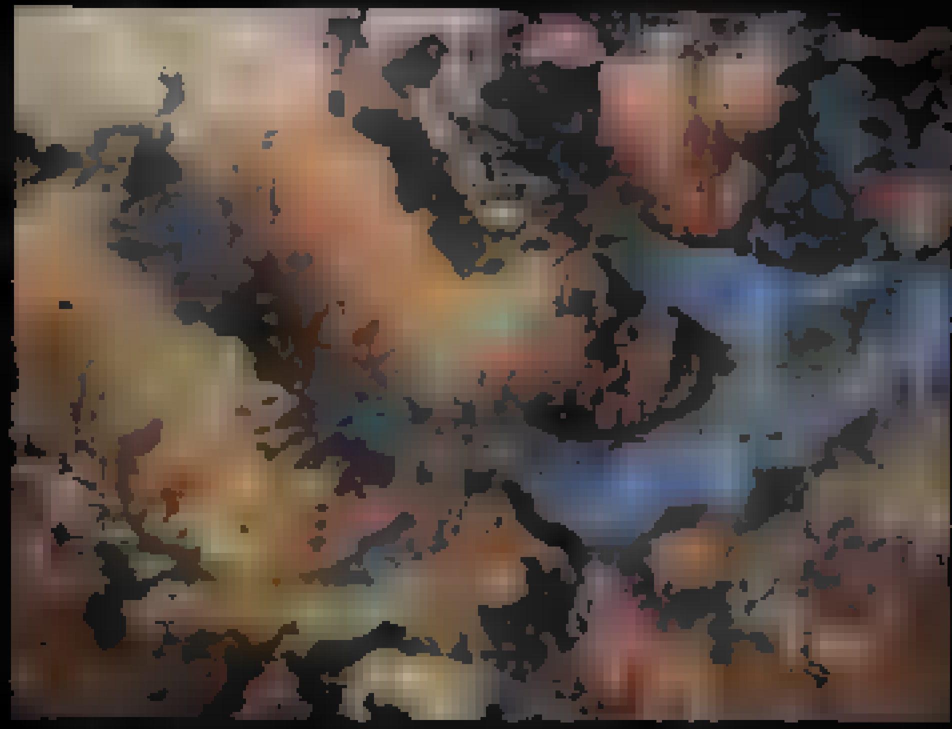
AQUACULTURE CAGES OFF NAMIBIA 3



LAKE NATRON, TANZANIA 4



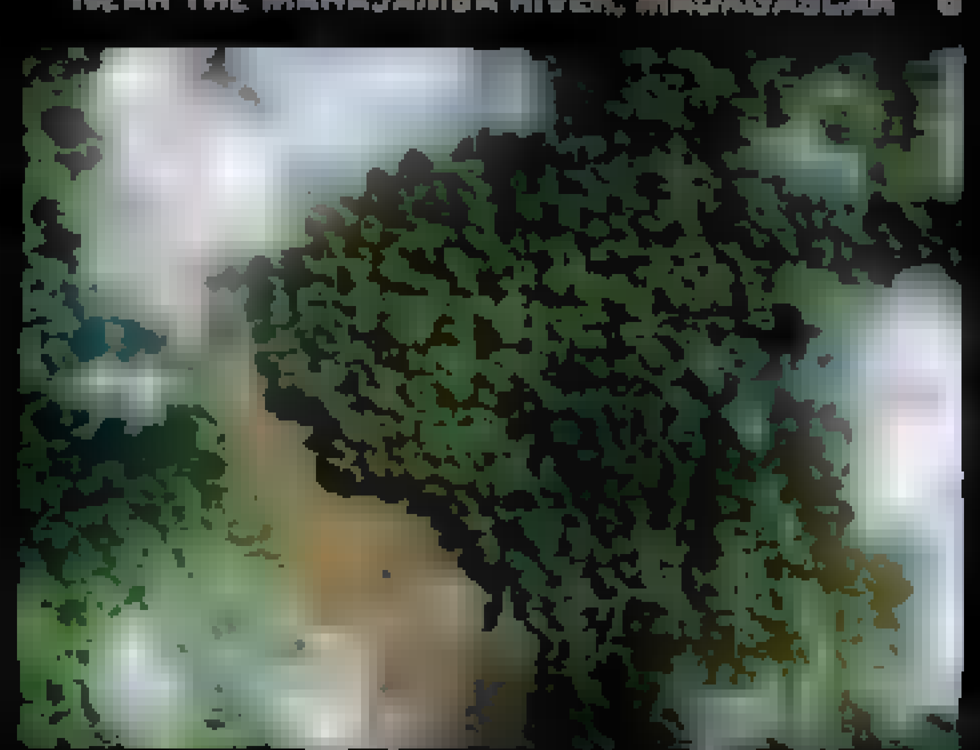
BUFFALO, ZAMBEZI DELTA, MOZAMBIQUE 5



NEAR THE MAHAJAMBA RIVER, MADAGASCAR 6

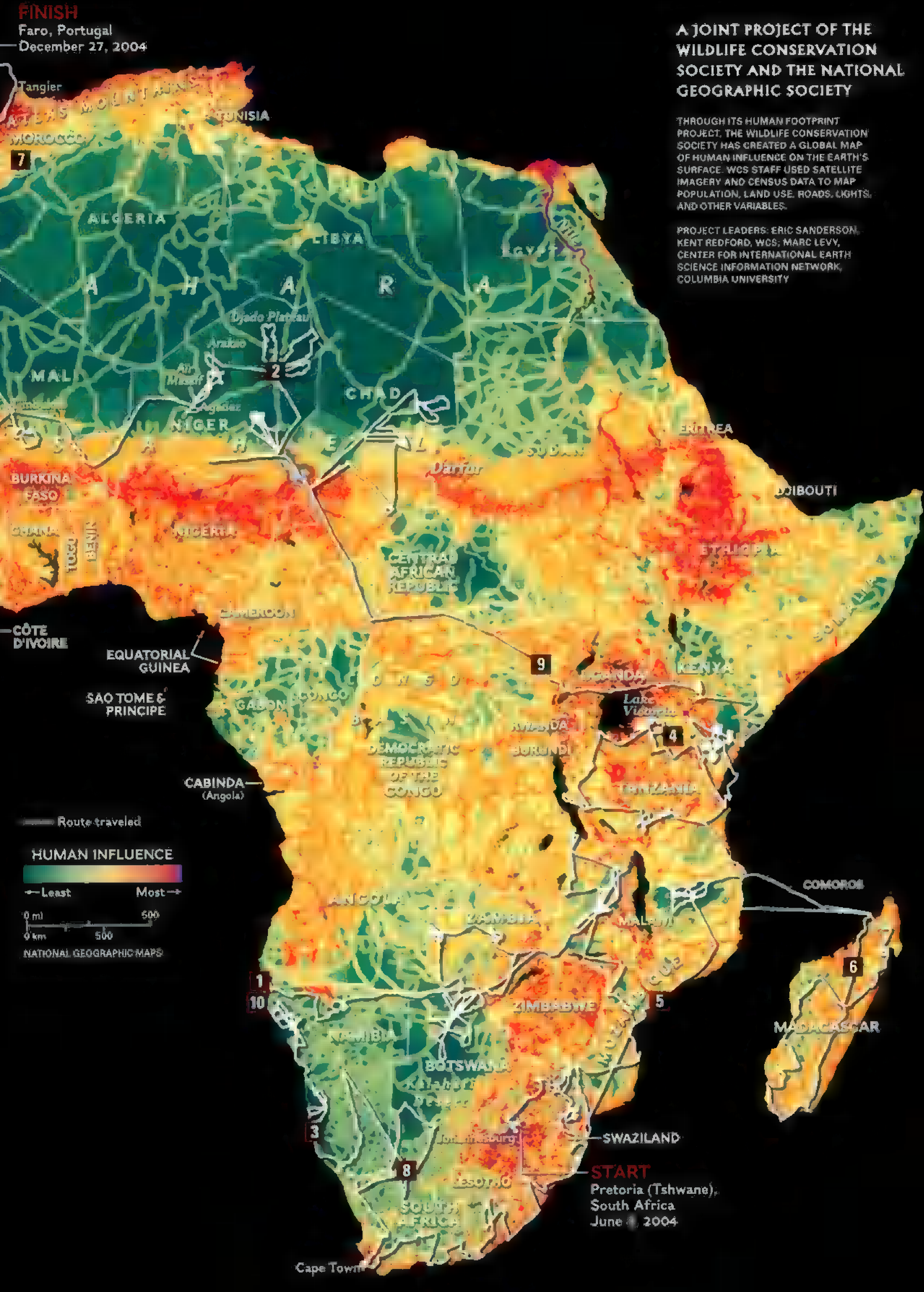
CASABLANCA, MOROCCO 7

GRAVEYARD, SOUTH AFRICA 8



ITURI FOREST, CONGO BASIN 9

FUR SEALS, SKELETON COAST, NAMIBIA 10



FINISH
Faro, Portugal
December 27, 2004
A JOINT PROJECT OF THE WILDLIFE CONSERVATION SOCIETY AND THE NATIONAL GEOGRAPHIC SOCIETY
THROUGH ITS HUMAN FOOTPRINT PROJECT, THE WILDLIFE CONSERVATION SOCIETY HAS CREATED A GLOBAL MAP OF HUMAN INFLUENCE ON THE EARTH'S SURFACE. WCS STAFF USED SATELLITE IMAGERY AND CENSUS DATA TO MAP POPULATION, LAND USE, ROADS, LIGHTS, AND OTHER VARIABLES.
PROJECT LEADERS: ERIC SANDERSON, KENT REDFORD, WCS; MARC LEVY, CENTER FOR INTERNATIONAL EARTH SCIENCE INFORMATION NETWORK, COLUMBIA UNIVERSITY
Tangier
TUNISIA
MOROCCO
7
ALGERIA
LIBYA
Djado Plateau
2
CHAD
NIGER
Darfur
SUDAN
ERITREA
DJIBOUTI
BURKINA FASO
NIGERIA
GHANA
TOGO
BENIN
CENTRAL AFRICAN REPUBLIC
ETHIOPIA
CAMEROON
CÔTE D'IVOIRE
EQUATORIAL GUINEA
SAO TOME & PRINCIPE
GABON
CONGO
9
UGANDA
KENYA
Lake Victoria
RWANDA
BURUNDI
4
DEMOCRATIC REPUBLIC OF THE CONGO
TANZANIA
CABINDA (Angola)
Route traveled
HUMAN INFLUENCE
Least
Most
0 mi 500
0 km 500
NATIONAL GEOGRAPHIC MAPS
ANGOLA
ZAMBIA
MALAWI
COMOROS
6
1
10
5
ZIMBABWE
MADAGASCAR
NAMIBIA
BOTSWANA
3
SWAZILAND
8
LESOTHO
START
Pretoria (Tshwane), South Africa
SOUTH AFRICA
Cape Town

sands fall. The dunes rise, some up to 900 feet. And here they linger, bunched and tall, majestic and delicate and dynamic, continually sliding away and continually rebuilt.

With his stylus, Fay taps a laconic note into his lap Tablet: "mountains of luscious sand." His vertical photos will say that and more.

Mario drops one wing, and we circle out over the desert. Gaping back, we see the dunes with their shadows and edges in bright silhouette before the mountains. Light against dark, smooth against jagged, from this angle they seem to be pouring down slowly from the highlands like a glacier of sand. We circle again. Three separate GPS units—two for Fay's system, one for the plane—trace our loop. The door camera goes click click click. With a second camera, at the opened window, Fay takes handheld shots. Desert wind fills the cockpit. And I begin, when Ascani isn't jabbing my ribs, to shape an inchoate thought: mountains of sand, mountains of data. Metaphor is unscientific, I know, but then again I'm not a scientist.

Here we have nothing but tiny particles, assembled by a persistent force, yet the collective effect is momentous and grand. As for Fay? He's trying to create his own Arakao.

TODAY IS OUR TENTH DAY of survey flying in Niger, and the 187th day since Fay and his chief pilot, Peter Ragg, departed from an airfield in South Africa on this latest breakneck adventure in ecological reconnaissance, loosely labeled the Megaflyover, for its parallels with Fay's Megatransect. (See October 2000, March 2001, and August 2001.) No, the jungle boy hasn't gone soft. Traveling by bush plane rather than on foot, covering hundreds of miles a day rather than half a dozen, sitting dry in the sky rather than slogging through blackwater swamps and thorny thickets, doesn't actually represent a change toward safety and comfort. It merely adds scope.

Whereas the Megatransect was a single long hike across some of the wildest remaining forests of central Africa, the Megaflyover is a zigzaggy marathon of low-altitude flights tracing cloverleaf patterns over much of the continent, from Cape Town to Tangier. Despite the differences in mode of travel and geographic reach, the Megaflyover has a similar purpose: to gather abundant, incremental, and systematized data on the state of wild landscapes and the trends of human-caused transformation. Fay's motive isn't idle curiosity. His aerial enterprise is closely linked with—and to some extent inspired by—a major initiative of the Wildlife Conservation Society, known as the Human Footprint project. That project, which involves an ambitious program of multidimensional mapping to show gradients of wildness and human impacts around the world, is intended to help WCS target conservation efforts. Fay himself, a restless individualist with a surprisingly good nose for politics, wants nothing less than to change the way the world perceives and uses ecosystems and natural resources—starting with perceptions in Washington, D.C. The ultimate goal of his Africa Megaflyover, he says, is to convince "the powers that be, in particular the U.S. Congress," that integrating natural resource management into American foreign policy is "a very, very smart thing to do. And a good investment."

Of course Africa isn't a place; it's a million places. Its

Wherever humans live at high population densities, making unsustainable demands on natural systems, he notes, you eventually see ecological breakdown, unmet needs, and tensions that lead toward conflict. Look at Darfur. Look at Rwanda. Look at Zimbabwe. Get beyond the headlines, beyond the tribal and racial animosities, to the resource disputes that underlie them. He's a collector of small facts who likes to think big, and his current line of thinking involves the strategic security issues inextricably linked with water, soil, mineral deposits, flora, fauna, and ecological health. To that end, he conceived the Megaflyover. As a pilot himself, he recognized the value of low-altitude flying to illuminate the realities of land use. A bush plane shows you patterns you'll never perceive from the ground, while allowing flexibly targeted coverage ("Let's circle that spot again") and the capture of fine details you can't get from a satellite. A modified Cessna 182 was the logical tool. Africa, the continent he knows and loves best after 25 years of working there, was the logical place.

FREE ONLINE Find the magazine's Megatransect stories at ngm.com/africa.

Of course Africa isn't really a place; it's a million places. Its history is as deep as Precambrian bedrock, its landscapes more diverse than those of any other continent on the planet. Nowadays it encompasses 47 countries (not counting Madagascar and other islands), hundreds of tribal and ethnic entities, a total population of 900 million humans. It can also be parsed into 104 terrestrial ecoregions (according to another mapping project, this one done by the World Wildlife Fund), each unique in its physical and climatic features and harboring a distinct plant and animal community. Those ecoregions in many cases transcend national boundaries. They range from the Succulent Karoo, in western South Africa and Namibia, to the Saharan Halophytics in northern Algeria. They also include the Western Congolian Swamp Forests, the Itigi-Sumbu Thicket, the Angolan Miombo Woodlands, and many exotic-sounding others. Within or near all these ecoregions live people, at greater and lesser concentrations, whose most elemental struggles and aspirations transcend ecological boundaries as well as national ones, thrumming steadily like the bass notes of a symphony.

Anyone who listens can detect those notes. Africans want better and fuller employment. They want food security and education for their children. They want good governance, free of oppression and corruption. They want fair, sensible arrangements for the management of wild landscapes and natural resources—arrangements chosen and controlled by Africans. They want peace. They're proud to be African as well as proud to be Dogon or Fang or Tuareg or Samburu or Tutsi, to be Kenyan or Ghanaian or Gabonese. Directly or indirectly, they suffer from the widespread ravages of AIDS, the pressures of population growth, and the broadly ramifying crush of poverty. Old-fashioned colonialism is mostly gone, but its thefts and damages haven't been well rectified. Increasing urbanization brings rural people toward new enticements, new opportunities, but also toward new disappointments and miseries. In worst-case situations (such as the current crisis in Sudan's Darfur region) political and ethnic conflicts combine with severe natural circumstances to produce masses of refugees, famine, state-condoned persecution, a culture of bloody lawlessness, and even genocide.

Along with the human struggles come human impacts. Although some areas of landscape are less heavily inhabited than they might be, others are overburdened, eroded, blighted by the presence and demands of too many people. Because the African landmass is so large, climate change may affect its interior regions disproportionally, bringing considerably higher temperatures, worse droughts and floods, increased desertification, and new patterns of disease. Poaching wildlife, both for subsistence and commercially, is an old problem but still serious. Timber harvesting, even when done selectively, often brings workers who empty a forest of its fauna for bush meat. War is bad for gorillas and other living things.

None of these concerns is unique to Africa, but given what's at stake, the African particulars deserve special attention from the rest of the world. Africa's glories and successes deserve special attention too. Despite all travails, African peoples produce magnificent art, graceful cultures, terrific music, great works of the mind, and astonishing acts of political and moral courage. Imperialist rhetoric once branded it the "dark continent," but that was blind and stupid, not just wrong. It's bright with variety, tribulation, and joy.

FAY'S INTENT with the Megaflyover is to document the ecological dimensions of that variousness. His conceptual starting point was the World Wildlife Fund map of 104 African ecoregions and the Human Footprint project, conceived by Eric W. Sanderson and a team of colleagues at WCS and Columbia University. Sanderson's group used nine different geographic data sets (measuring factors such as road density, railways, population density, nighttime lighting) to represent the weight of human influence all over the planet, including Africa. Fay wanted to cover as many of the 104 regions as time, budget, and politics would allow, in order to collect an enormous body of data reflecting incremental gradients between wilderness and urban glare, between stewardship and abuse, between what is possible and what is actually happening on the ground. Then

landscapes are more diverse than those of any other continent.

he would present this database to decision-makers and allocators of money—in Africa, in the U.S. Congress, wherever—and say: Here's some information that might be relevant to your resources-and-security planning.

He recruited Ragg, an experienced bush pilot (and, in an earlier life, a successful optometrist in Austria), who offered his flying skills and the use of his two vintage airplanes, one for primary data gathering, one for support. Ragg in turn enlisted his fellow Austrian, Mario Scherer, who had found African bush flying a lively change from his recent work as a war-crimes investigator in Kosovo. Fay drummed up support from various sources—the Human Footprint lab at WCS, the WILD Foundation, the Bateleurs (an Africa-based organization of bush pilots volunteering for conservation), and, as chief financial sponsor, the National Geographic Society. The first takeoff was on June 8, 2004, from Swartkop Air Force Base near Pretoria, soon after which—OK, it was five minutes—Fay's network of digital gizmos suffered an outage. The camera quit, the computers went to battery power, and he sniffed a hint of electrical fire. Oh well, he thought, better a data-system meltdown than full-on engine failure within sight of the runway. He re-rigged.

Fay wants nothing less than to change the way the world

Hopping his way across southern Africa and then northward on a sinuous chain of one-day flights, Fay arranged collaborations wherever possible with local conservationists, field scientists, or national agencies, assisting them with their aerial-survey needs as well as adding data to his own comprehensive trove. In Namibia he worked with Keith Leggett, a researcher tracing movement patterns of desert-dwelling elephants. In Tanzania he helped David Moyer and other members of a WCS team, in conjunction with TANAPA, the national parks agency, on an assessment of crucial ecological corridors connecting protected areas. In Chad he partnered with Malachie Dolmia, a young scientist at the Ministry of Environment, to look for populations of Barbary sheep, dorcas gazelles, and other large mammals in areas outside the Chadian national parks. In Kenya he offered flight hours to Iain Douglas-Hamilton, the eminent pachyderm expert and founder of Save the Elephants. In Niger, besides teaming with Ascani and SOS Faune, he got crucial help from Hubert Planton, a consulting conservationist, and coordinated his mission with the Directorate of Fish and Wildlife, through its director, Ali Harouna. Wherever he went, Fay tried to complement the aerial data-gathering with contacts, conversations, and observations on the ground. There was so much to learn and, for his purposes, very little that wasn't relevant.

MANY COMPUTER CRASHES, camera shutdowns, and other minor problems have followed that first glitch above Swartkop. Most were easily repaired. There have also been a few dire aviation scares, caused by high winds, drastic loss of oil pressure, and other forms of mischance. But Fay is persistent—sometimes, in Peter Ragg's candid view, crazily and obnoxiously so. By the time I met them in Niger, Fay and his pilots (accompanied intermittently by Ragg's pilot wife, Hannelore) had flown 600 hours, crisscrossing 16 countries, usually at about 500 feet above the ground. The vertical camera, firing steadily at three shots a minute, had taken about 92,000 images. One of the Cessnas had gotten a new engine. Both planes needed maintenance.

Team spirit was in disrepair too. Tensions had grown. Flying a Cessna four or five hours a day at low elevation, day after day, for six months, gets exhausting. And flying in the Sahara during the period of harmattan, dry easterly winds, is harder on planes and pilots than flying over the plush canopy of a tropical forest. A sandstorm can be deadly. Fine dust (along the desert's southern edge, where there's some dry soil, not just sand) carries subtler dangers. Such dust sometimes rises even on light winds, filling the air at low elevations with a brown haze that erases the horizon, threatening vertigo. A pilot caught in that guck might steer into a hillside or, if he ignored his instruments for a moment too long, lose track of horizontality altogether and slam-dunk himself into the ground. Dusty blur-outs had bedeviled Fay's group in Chad and continued to cause anxiety during the weeks I was with them in Niger. After our first desert flight, Ragg told me, the new air filter he'd installed was already filthy. He scooped out a tablespoon's worth of powdered Sahara. Not good. A plane's

engine must breathe. And grit in the cylinders—ugh. Plus, what could you see, what could you accomplish? Unless conditions improve, Ragg argued, we should abort the Niger sequence and get out of here. "It's a waste of fuel, it's a waste of time, it's a waste of engine," he said. "And at the end of the day"—that is, if a plane choked and went down—"it's a waste of life."

Fay's view, conveyed to me while we were aloft with Mario, was more sanguine. Flying in bad air was like "living the life of a carp rather than living the life of a trout," he said. "I'd rather be a trout." But if the food was on the bottom, in murky water, he'd be a carp. As for me—at least until my stomach adjusted to the low-altitude scanning, the sepia air, the smeary horizon, the tight circling, and the fumes vented by that auxiliary tank—I felt more like a dyspeptic walleye.

But visibility improved, off and on, and we kept flying. From the air over Niger we enjoyed some notable sights: a pair of addaxes skittering like sand crabs along the lee of a linear dune, seven Barbary sheep galloping up a kori, sausage-like towers of dark sandstone along the escarpment of the Djado Plateau, camels standing stuporous and serene in the middle of nowhere. Near one village we gawked down at a cluster of saltmaking pits, each pit a nice disk, variously sized, variously colored, shining azure or turquoise or coppery green from the mineral solutions of their individual sumps, all together like a necklace of bright-colored jewels.

Mostly what we observed and recorded, though, were variations on the theme of absence: absence of people, absence of roads, absence of wildlife, of water, of vegetation—absence of topography itself. Sometimes we looked down and saw nothing but beige flatness, just *nothing,* even when the visibility was good. Some days we flew a 400-mile loop without glimpsing a single animal, and dozens of miles without spotting so much as a plant. Never mind. Even absence is a form of data. Niger is a country of austere landscapes, spectacularly desolate in their own ways but further desolated by recent human-caused losses. The addax is nearly extinct here, for instance, and the Barbary sheep, and the desert cheetah; their disappearance from remote habitat areas may correlate with the presence of four-by-four tracks, indicating unimpeded access by poachers. Such tracks show clearly from 500 feet up. Measures could be taken. Fay will offer all his findings to the Nigerien officials responsible for protecting what remains.

perceives and uses ecosystems and natural resources.

ONE THING THAT REMAINS, tangible on the ground and indelible in my memory, is the assemblage of dunes at Arakao. Disappointed at having seen no sheep in the Aïr Massif, suddenly we were thrilled. We all pressed to the windows, even Ascani, the old Niger hand. Then, as we circled wide around those great soft mounds to admire them from all angles, another odd sight came into view: a large green oval. It was a pond, evidently spring-fed from beneath the sands. Water?

Fay peered down for a moment and then, having noticed something, tapped a note into his Tablet: "no animal tracks." It hadn't struck me, but of course: A water hole out here should attract gazelles and other mammals from many miles around—attract them, that is, if any exist. He tapped again: "4x4." Meaning, tire marks. An absence of animal sign, a presence of human sign. Cause and effect? Anyway, data.

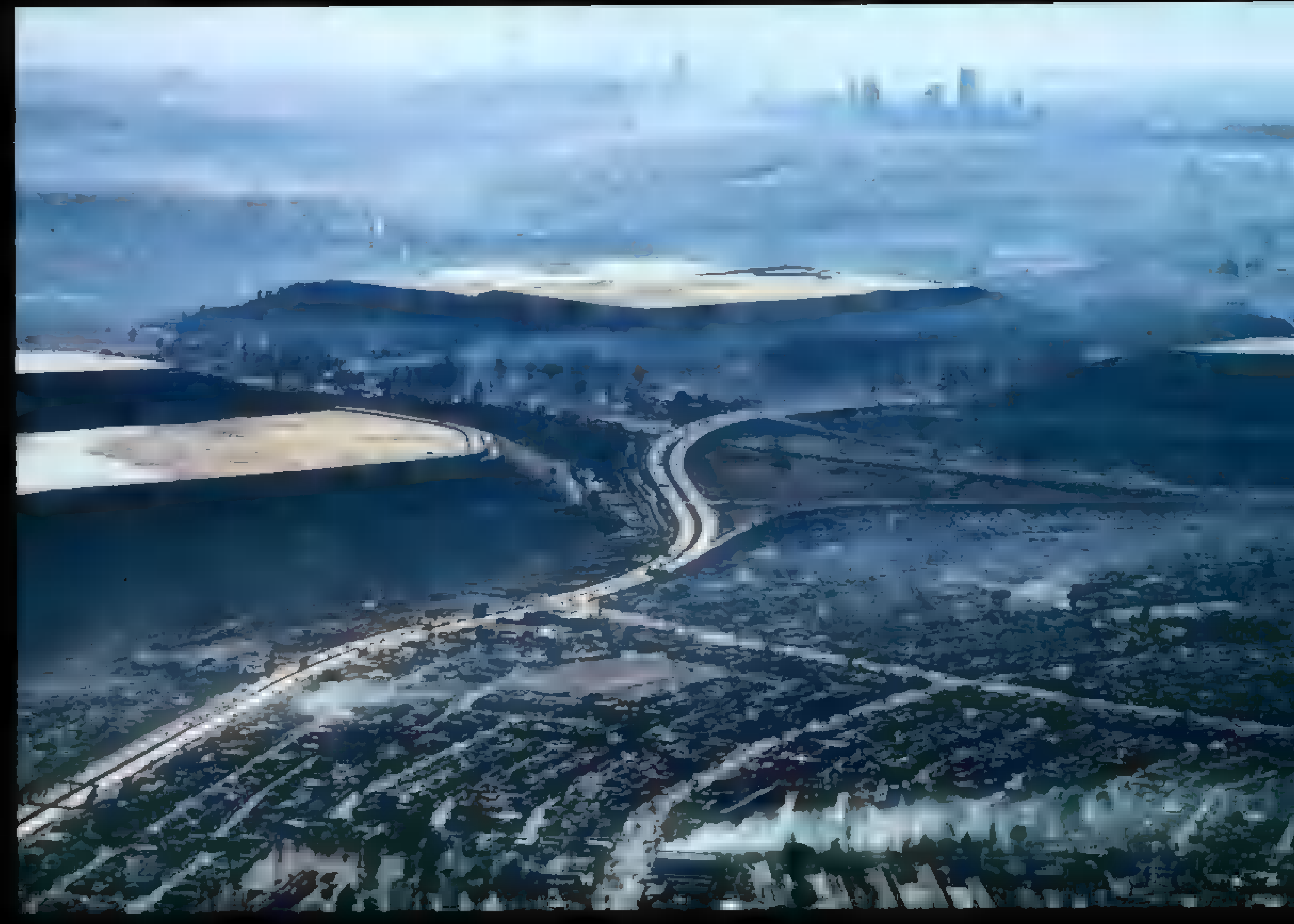
I was still mesmerized by the dunes. They seemed the perfect icon for what Mike Fay has strived to produce, first in his Megatransect, and now by way of his Megaflyover: a vast aggregation of tiny particles, in the form of data, heaped together for larger effect. The individual grains are innumerable and insignificant. The task of collecting them is tedious, arduous, and risky. It couldn't be done by just anyone. It takes a dry mind and a will like desert wind.

The tricky part that we should remember, and he too, is that Arakao is more than a huge sandpile. It's an uncannily beautiful huge sandpile. The last challenge for Fay, as he processes and presents his data, is parallel to that miracle of beauty, but slightly different. From a mountainous pile of facts and photographs he must deliver meaning.

WATCH PHOTOGRAPHER George Steinmetz in action in his ultralight as he shoots images of elephants, waterfalls, Maasai villages, and more. Then join our forum: How do you think humans and wildlife can best live together? **ngm.com/africa**

MOROCCO

Mortared with mud, the 18th-century village of Aït Ben Haddou blends the handiwork of nature and man. Its multitiered dwellings and ornamental towers—now largely deserted—stand as hallmarks of Moroccan architecture. Protected since 1987 as a UNESCO World Heritage site, the village draws a daily stream of tourists and traders.



Modern Homo sapiens *first appeared in Africa nearly 200,000 years ago, and ever since, people have reshaped the landscape. Thousand-year-old dwellings camouflaged by Mali's thousand-foot-high Bandiagara Cliffs (top left) hid sure-footed inhabitants from explorers, religious missionaries, and even close neighbors until recent times. Thatched roofs made from the dried leaves of coconut trees dot the remote Indian Ocean coastline on Kenya's Kiwaiyu Island (left), part of a marine reserve where villagers are allowed to fish for subsistence and trade. Polluting the air and water, massive mounds of discarded gold tailings mar Johannesburg (above), which began as a mining town when gold was discovered in South Africa in 1886. "Earth's bounty is the true measure of a society's wealth," says Mike Fay. "But how deep should we dig to maintain human success?"*

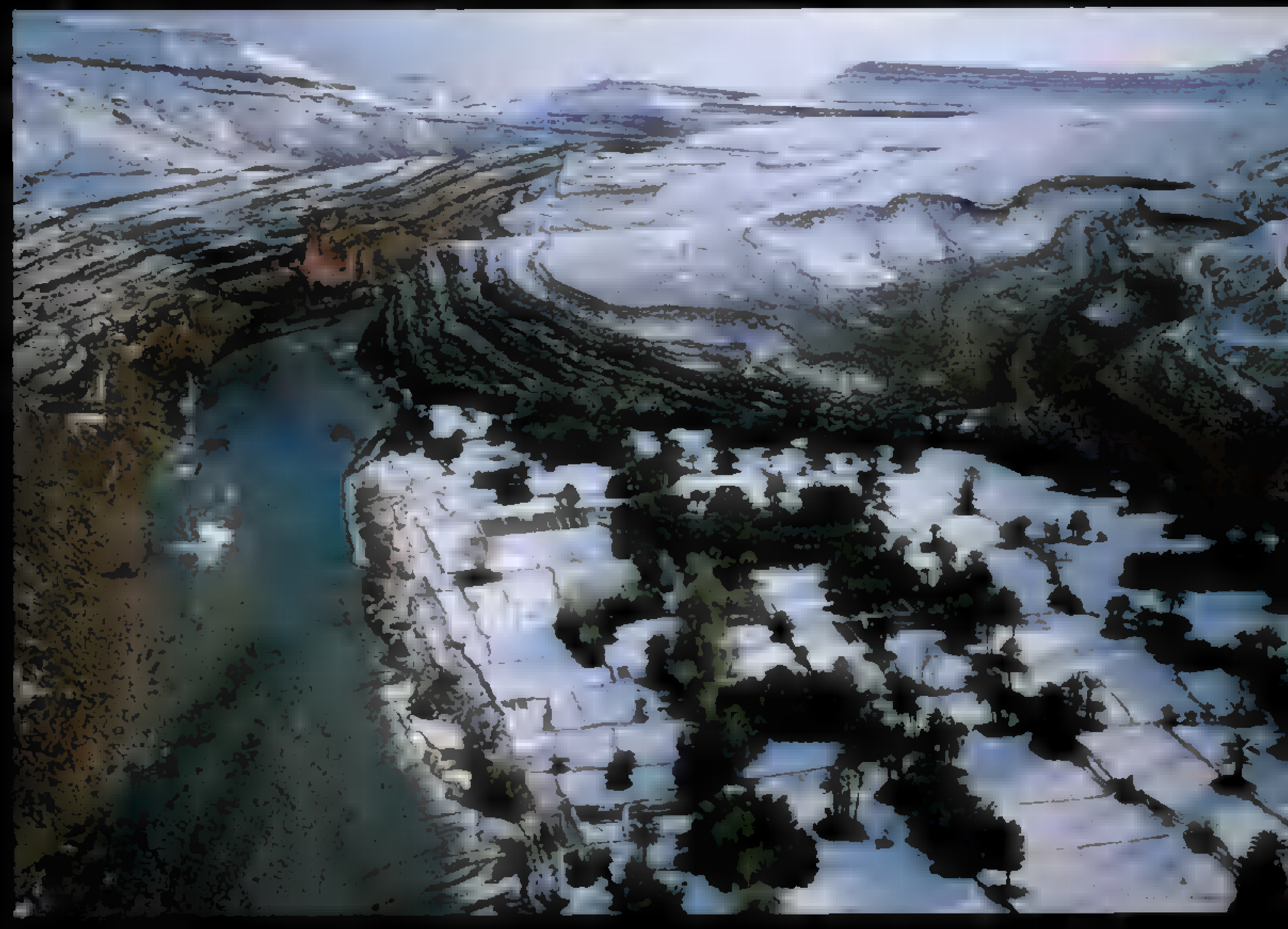
KENYA

Elephants wade through swamp grass in Amboseli National Park, leaving behind telltale trails. A worldwide ivory-trade ban has helped boost Kenya's elephant population. The elephants' traditional ranges take them outside park boundaries, where they infuriate newly settled farmers by eating their crops.

▶ Download as wallpaper at ngm.com/africa.

CHAD

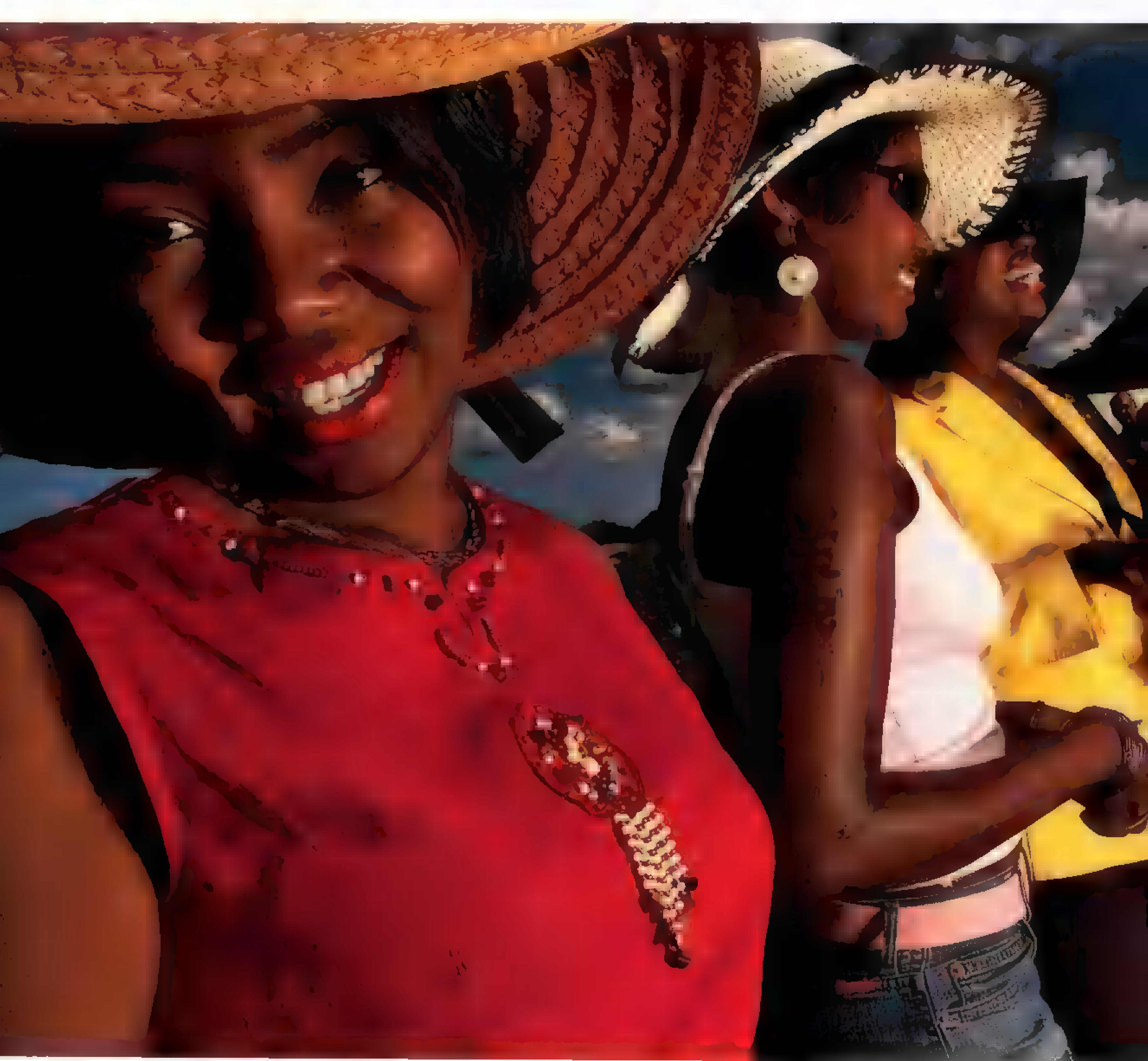
Sandstone pinnacles rise above the desolate Karnasaï Valley near the Libyan border. Few outsiders venture into this Saharan no-man's-land, pocked with land mines left over from clashes between government troops and rebels.



"The human capacity to manage land is great," says Mike Fay, "and the capacity for destruction even greater." A patchwork of crops covers nearly every inch of volcanic earth in northwestern Rwanda (left), a densely populated country where 90 percent of the citizens are farmers. Blanketed by the first snow in 32 years, the well-irrigated Ziz Valley (above) provides a fertile oasis for date palms, grains, and vegetables in Morocco's rugged Atlas Mountains. In arid northern Kenya (top left) herders drive their livestock home from one of several towns where Christian organizations provide drought relief. Such towns attract herders seeking food, water, and safety—and have strained the surroundings. "There is not enough vegetation around the relief stations to support livestock all year," says anthropologist Elliot Fratkin, "so the herds must remain mobile to survive."

NAMIBIA

Zebras thunder across plains pockmarked by mysterious circles on the NamibRand Nature Reserve. What causes these grass-ringed bald spots remains unknown—as does the final result of Mike Fay's huge aerial mosaic. His next mission: To connect all these photographic dots to render a big picture of what Africa is losing and what might still be saved. ■



A BOISTEROUS METROPOLIS GLOWS WITH THE PROMISE OF A BETTER LIFE—BUT DOESN'T ALWAYS DELIVER.

Inventing a City Nairobi

Relaxing with friends, Eunice Rúgúrú Mwangi enjoys an afternoon at Ngong racecourse. With a postgraduate degree in business, she holds a position as a strategic communications consultant. Even as the number of educated women in Nairobi grows and the middle class expands, the gap between rich and poor remains wide. Newcomers keep pouring into the city from the countryside, bringing little with them except hope.

GOOD LIFE ON THE OUTSKIRTS

Raised in Uganda, 74-year-old Terry Mathews nearly lost his life in a rhino attack during his career as a hunting guide. With big-game hunting now banned in Kenya, many visitors to protected game parks come to shoot photographs. Mathews and his wife, Jean, make their home on the edge of 45-square-mile Nairobi National Park, the only reserve in the world bordering a capital city. Their son Phil, a pilot who lives next door, returns home in his helicopter with his children after school (above). Mathews prefers life outside the city to living downtown, he says. "You can see Nairobi from here, but you can't hear it or smell it."

CHOSEN IN A DREAM

"I was called to the ministry in a dream," says 70-year-old Reverend Christopher Mwenama, who leads the evangelical African Divine Church in Kibera, a shantytown of some 800,000 people near downtown Nairobi. Running straight through Kibera—one of the largest slums in Africa—the Mombasa-Uganda rail line forms a kind of sidewalk on Sunday for a sea of residents on their way to countless small places of worship. Like many preachers who have other jobs, Mwenama also works as a house servant. But when he broke his leg last year, he couldn't keep working. "So right now I am living in my daughter's house."

BY BINYAVANGA WAINAINA | PHOTOGRAPHS BY DAVID ALAN HARVEY

F

FOR THOSE TRYING to understand it, Nairobi can be a very slippery city. Four years ago I came back after spending a decade in South Africa—my mother had just died, and I was tired of being away from home. But it was difficult to adapt. I found myself living at the edge of Mlango Kubwa, a slum on the east side of the city, in a cheap hostel called Beverly Hills, where college students and the newly employed lived. That first night there was a flood, and I woke up to see my laptop floating in four inches of water.

I slipped and slid and fell in love with this city. Mlango Kubwa is all motion—streams of people finding original ways to survive and thrive. You never get the impression there are fixed and rooted institutions (buildings, legal entities) around which people organize. The organization of Mlango Kubwa is hidden in the unhindered to-ing and fro-ing of people feeling their way through the day.

It was at Beverly Hills that I met Mash (short for Macharia), who reintroduced me to Nairobi. We would walk together down Moi Avenue, the street that leads from Nairobi the international city to the undocumented sprawl of an evolving African city: people and their small, illegal constructions fronting opaque skyscrapers; secondhand-clothes shacks and rickety vegetable stands; wooden cabinets behind which whispered price-setting over watch repairs takes place in Dholuo, the language of Lake Victoria; shoe shiners and shoe repairers soliciting work by keeping eyes on the feet of passersby. These people tell tall political tales that later turn out to be true.

Mash was in his late 20s. His father had been a wealthy man. He was, to Mash, a man living in English, who believed in education and "fair play." A man who invested a lot of time telling his children to look forward, to the West, to progress. Then he died, and at his funeral another wife and three children appeared, as if from nowhere. Mash's father had managed to hide a family for 20 years.

In order to negotiate our complex lives, Nairobi people have learned to have dual personalities. We move from one language to another, from one identity to another, navigating different worlds, some of which never meet.

Mash would go to work in the morning for a tour company, where he spoke good private-school English. In the evening we would cross to Biashara Street in Mlango Kubwa to drink and talk. We would speak in English about philosophy or literature or the formal job market. We would speak in Kiswahili about life in general, about the little things that made up our

"When the U.S. government says Nairobi is not safe, I think it's political," says taxi driver John Wariara Kamau, who has made it his cause to combat the city's tarnished reputation. "Even in Washington, there are spots that are not safe." During the 1990s a wave of carjackings, bank robberies, house break-ins, and street muggings in Nairobi prompted the U.S. State Department to issue warnings to visitors.

day. We sought a kind of brotherhood from our conversations in Kiswahili—speaking always in a mock-ironic tone, laughing a lot, being generous about each other's opinions, offering each other drinks and favors in ways we could not in English.

We hide whole lives in the gaps between these forked tongues. This is how Mash's father managed to hide his village family for so long. He was somebody else, somewhere else, in another language. His story is not unusual.

Mash seemed to know everybody and have a thousand deals running at the same time. He had shares in a small shop selling mobile phone airtime; some weekends he would go up-country to buy mung beans to sell in Nairobi. Much of the money he made was spent on lawyers. He felt it was his responsibility to restore to his mother items he believed various relatives had stolen from her.

I saw him in action one day in Mlango Kubwa when we stumbled upon a group of women, secondhand-clothes dealers, who had caught a thief—a dirty, disheveled young man, eyes bleary from sniffing glue. A crowd had already gathered. They were ready to beat him to death.

In Nairobi, where the police are the enemy, there are people who take charge in incendiary situations. Mash was masterful. He speaks Kikuyu very well, and he used it now. We, the Kikuyu, place great stock in people who are able to "speak well"—those who can command attention, even change behavior, through the power of their rhetoric.

As the women were about to turn over the thief to some men who had gathered around, Mash

addressed the women with a Kikuyu proverb about men not knowing how to deal with difficult situations: "*Maitu, tha cia arûme itirî iria.*" Which means, "Men cannot stop the crying of a baby by suckling it."

The women laughed.

In half an hour they were pacified, confident the case would be dealt with by the government-appointed chief of the area, and that what had been stolen would be returned. The women then started to banter with Mash, flirting with him. They gave him a free raincoat.

AT DUSK Mash and I walked lighter. There is something magical about the moment when the light softens and the city stops glaring and people are removed from themselves by this hour of transition: Vendors packing away their mobile shops; children cut loose from school, shrieking on their way home; workers on their black Chinese-made bicycles, ringing bells, hurling warnings and threats; people everywhere streaming through alleyways and around familiar obstacles.

On lower Moi Avenue *matatu* minibuses gather, bound for Buru Buru, one of Nairobi's largest and best known housing projects. The matatus are frenetic, horns chirping loudly like warring tropical birds, yellow lights blinking on their domed foreheads, neon-painted teeth snarling around their snouts, bright-eye headlights gleaming in the dark. Matatus flash urgency, hoot urgency, battling each other to snag passengers in a hurry to go home. But this urgency is fake: The matatus will always wait until they're full, then overfull, moving off only when bodies are hanging outside doors, toes barely in the vehicle. "*Songasonga mathe, songasonga*—Move mama, move."

"I like school," says 11-year-old Mary Akinya, smiling shyly in her Sunday best just after church in Kibera. "I like reading in Kiswahili [Swahili]." Chances are, Mary wouldn't be attending school except that Kenya's newly elected government introduced free primary school education in 2003. About 1.7 million children previously excluded from the system are now enrolled. "I am reading a story about a cheetah, elephant, zebra, and lion. They are fighting over who is strongest. But the zebra is the smartest and he wins."

Nairobi Now

- **Miles from the Equator**: 80
- **Elevation**: 5,500 feet
- **Year city was founded**: 1899, on the site of a Maasai water hole as a camp for workers building the Mombasa-Uganda railroad
- **Meaning of *nyrobi* in Maasai**: Cool water
- **Growth in city population since Kenya's independence in 1963**: 800 percent, from 350,000 to 2,818,000 in 2005
- **Number of years life expectancy in Kenya has been reduced during the past decade, mostly as a result of HIV/AIDS**: 10 years, down from 57 to 47
- **Number of street children**: 15,000 to 25,000, many of them orphans of parents who died of AIDS-related illnesses
- **First African woman to win the Nobel Peace Prize**: Nairobi ecologist and activist Wangari Maathai

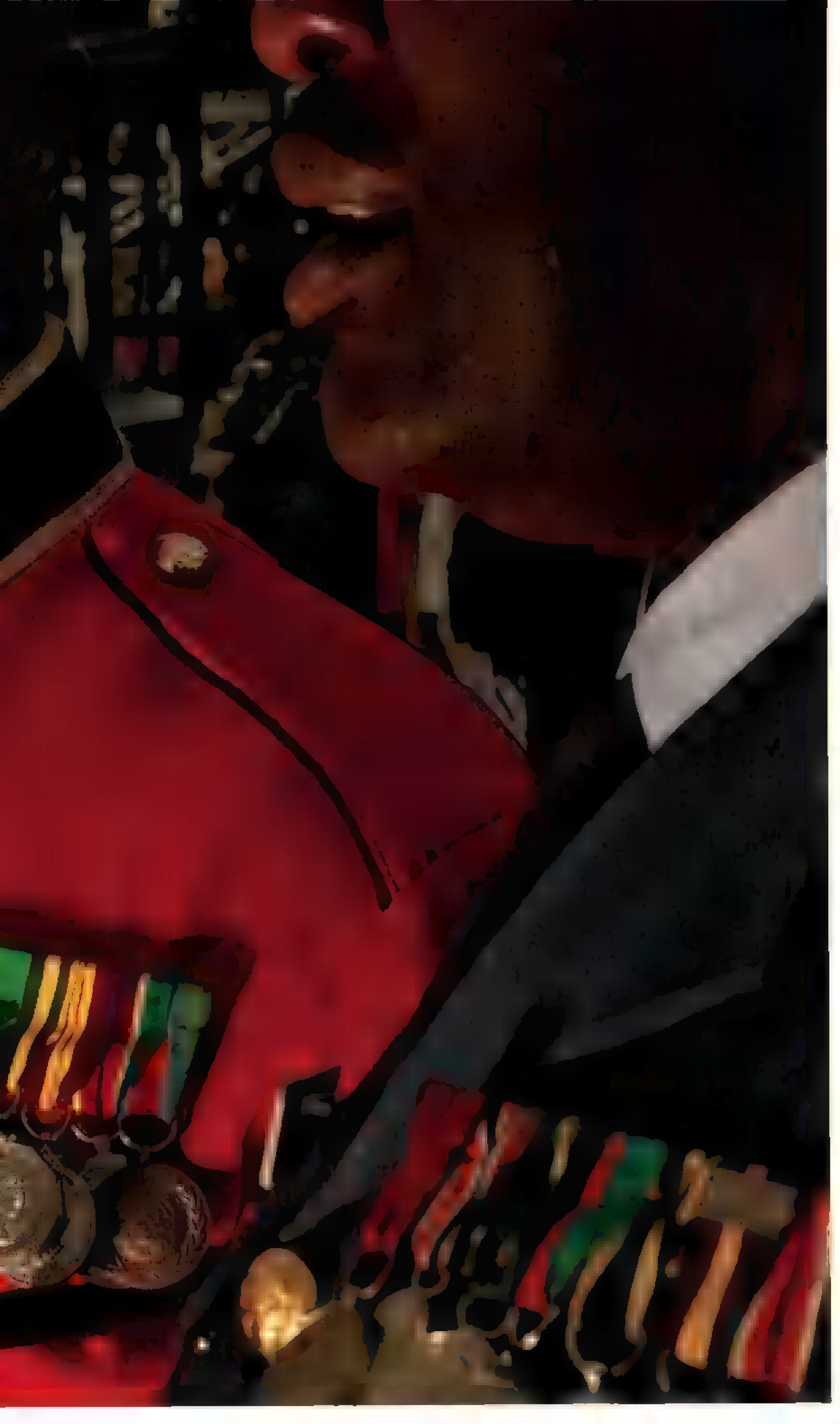
The newest matatus have plasma screens to show hip-hop videos. Always quick to find new ways to make money, matatus have managed to embody a look and sound and feel that is particular to Nairobi. Matatu culture has transported new words all over the city and made Sheng trendy. Sheng is a fast-growing creole language based on Kiswahili, with some English words and other words from the many tribes living here. Much of Kenyan rap, which now dominates the airwaves, is in Sheng.

At the bottom of Moi Avenue Mash and I reached Nairobi's railway station. There would be no city here if the railway had not been built at the close of the 19th century. A decade earlier, Kimnyole, the *orkoiyot* (spiritual leader) of the Nandi nation, warned of the arrival of a white tribe with an iron snake that would change everything. The center of power shifted from the village to this strange concrete thing called Nairobi. But Nairobi offers no time-tested, trustworthy way of living. Kitu-Sewer, a poet and rapper, captures our dilemma, singing: "*Umekwama na mimi ndani ya hizi mashahiri*—You and I are trapped inside our traditional poems."

This is the tension that best defines Nairobi: to try (and often fail) to live within the worldviews of our traditional nations; to try (and often fail) to be seamless, Western-educated people; to try (and often fail) to be Kenyans—still a new and bewildering idea.

GET PERSONAL Watch an interview with author Binyavanga Wainaina about the surprising ways people get by in Nairobi and view a slideshow with narration by photographer David Alan Harvey at **ngm.com/africa.**

PATRIOTS OF REVOLUTION



Representing the nation's armed forces at a Kenyatta Day ceremony, Navy Sgt. Maj. Ashford Ndubi Miriti, retired Army Sgt. Maj. Timothy Brown Wando, and Air Force Warrant Officer T. O. Ogutu honor those who died in the struggle for independence. "We must work harder to fight our enemies—ignorance, sickness, and poverty," said Jomo Kenyatta, leader of the insurrection against British colonial rule who became Kenya's first prime minister upon independence in 1963. In the decades since, Nairobi has played an active role as a meeting place to settle regional conflicts such as the wars in Sudan and Somalia.

"I can hold on like this for about 15 minutes," says day laborer Charles Mutuku Mutulili, who commutes to and from his home in Kibera by hopping a packed train, the cheapest way to get around. Most mornings Mutulili heads into downtown Nairobi looking for construction jobs. "There are a lot of people like me, a lot of them, looking for work."

Nevertheless, life here is OK, he says. He recently remarried, after his previous wife left him to go back to their home village.

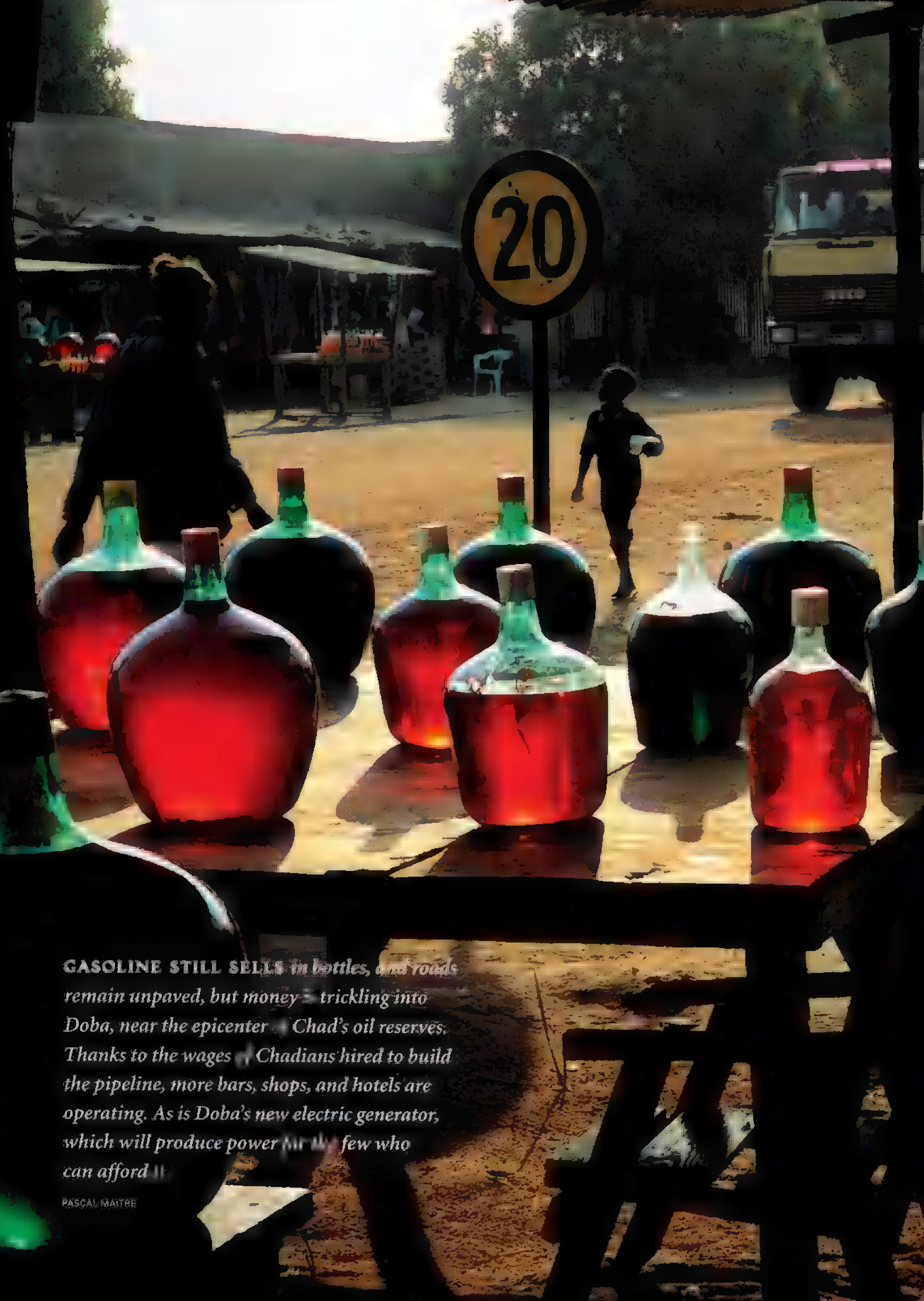
Nairobi too looks toward a brighter future, facing tough odds but making the best of things as it becomes an original African city. □

WEST AFRICA COULD DOUBLE ITS OIL PRODUCTION THIS DECADE. WHERE WILL THIS NEW WEALTH END UP—LINING THE POCKETS OF CORRUPT ELITES OR IMPROVING THE LIVES OF MILLIONS?

African Oil Whose Bonanza?

Oil tanks feed a pipeline that in 2003 began carrying Chad's petroleum to the world market—and returning riches to one of the world's most impoverished countries. In neighboring Nigeria, where oil-soaked workers (bottom) clean up yet another spill, 50 years of petroleum production have left the Niger Delta poor, violent, and polluted.

PASCAL MAITRE (TOP), ED KASHI



GASOLINE STILL SELLS *in bottles, and roads remain unpaved, but money is trickling into Doba, near the epicenter of Chad's oil reserves. Thanks to the wages of Chadians hired to build the pipeline, more bars, shops, and hotels are operating. As is Doba's new electric generator, which will produce power for the few who can afford it.*

PASCAL MAITRE

BY NICK KOTCH | PHOTOGRAPHS BY PASCAL MAITRE AND ED KASHI

W

WITH HIS WHITE BEARD, ready chuckle, and roly-poly shape, Otto Honke could easily switch to an acting job as Santa Claus if he decides that a career in development work in Africa, stretching all the way back to 1978, has gone on long enough. We're driving together in southern Chad's oil region, his base since 2002, inspecting health, education, and water projects financed by ExxonMobil, Petronas, and Chevron in a consortium that is pumping close to 200,000 barrels of oil a day from 6,000 feet below our wheels.

Honke's employer, a German aid agency called GTZ, was hired by ExxonMobil to build neat blocks of classrooms in villages where children used to learn their lessons under straw roofs sitting on thick branches. Solar-powered water towers have replaced traditional wells and their brackish contents with clean, fresh water drawn from deeper beneath the sandy soil.

The idea crosses my mind on this dry and sunny day that my 58-year-old traveling companion is already a kind of Santa figure, making simple wishes come true in a poor corner of Africa and trying to ensure that—for once—the discovery of oil doesn't have to be a curse for ordinary folk.

But this notion fails to survive our bumpy ride around the villages; it collides, quickly and fatally, with the negative reputation oil has earned all over the developing world and nowhere more than in this neighborhood. After all, Chadians only have to look over their western fence to Nigeria or, a little farther down the road heading south, to Equatorial Guinea, Congo, Gabon, and Angola, to see why oil in Africa is associated with problems, never with solutions.

In PR terms the crude black stuff is a hard sell, and the village projects we are touring are, at the very least, an acknowledgement of that reality. Not that charity enters into the equation, because they were built as tightly calibrated compensation for the compulsory sale of land or environmental damage or nuisance caused by Chad's recruitment, in 2003, into the club of Africa's oil-producing states. The price of entry was four billion dollars, said to be the largest amount ever spent on a private sector investment in sub-Saharan Africa.

Chad's infant oil industry is effectively a joint venture among the oil companies, the government, and the World Bank. Boiled down, their mission statement is to extract oil profitably, to share the proceeds in a transparent and equitable way, to protect the environment, and to spend most of the government's share on reducing poverty. The big question is whether this original formula can transform one of the continent's classic basket cases into a functioning state, providing its nearly ten million citizens—whose annual per capita income is about $1,600—with a decent future after decades of civil war, injustice, and upheaval.

But pending the achievement of this ambition, gratitude is simply not on the agenda in the villages we visit. Distrust and unsatisfied expectations certainly are.

"They said the majority of us would get rich, but we have just got poorer. Nothing good has come from the oil," mutters Mbangtoloum Ngarambé, a lanky peasant farmer who grows cotton, rice, and millet in the fields around his village, Kayrati. We stand in the shade of a mango tree, watching women and children filling their enamel basins at the new water pump, which seems to me to be working pretty efficiently.

"Isn't that something good?" I ask, interrupting the flow of Ngarambé's displeasure and pointing at the contraption.

"Yes, that's good."

"And the new classrooms over there?"

"Yes, they are good."

Cleaning his teeth with a little stick, Ngarambé studies me out of the corner of his eye as we run through all the things that are lacking around

here: a modern economy with jobs, a hospital close by, paved roads, security. We talk in French, a legacy of Chad's period as a colony of France until 1960.

Playing devil's advocate, I ask him why he expects so much to be provided by foreign oil companies and so little by his own government.

"You know very well that our government isn't going to do those things," Ngarambé replies.

PASCAL MAITRE

Imported from Houston, John "J. J." Johnston runs a rig in Komé, pumping oil that could bring Chad a projected six billion dollars. Pressured by the World Bank, the government has agreed to steer most of the money to the poor.

I sense that another of the farmers in our group, a compact man called Hubert Nodjimbay, has marked me down as an oil company stooge. He chips in.

"From five in the morning the village is invaded by dust from the trucks. The children are always coughing. But when you talk to Esso's people about it, they don't listen."

WHAT DOES ESSO, as ExxonMobil is known in these parts, say about that? That the company has never had to listen so intently and for so long as in southern Chad's Doba oil fields and in neighboring Cameroon, whose territory is crossed by the 663-mile pipeline that carries the heavy crude to an offshore loading terminal near Kribi.

"There has been the most preparation of any oil project in Africa, we know that for a fact," Miles Shaw, Esso's public affairs adviser in Chad, told me, reeling off the stats. "The sheer mass of numbers—over 6,000 village meetings, well over 150 people employed in the environmental and safety program," he said, answering my questions in a prefabricated office block inside "KFC," Komé Five Camp, the consortium's town-size operations center. "It's partly because this project has been so unique. There were 14,000 land users in Chad and Cameroon to negotiate with and who were compensated individually."

The negotiations seem to have been especially protracted in Danmadja, a settlement of 492 souls near Komé. In fact they were still dragging on in a desultory way when our masters-of-the-universe convoy of four-wheel drives rolled into the village, which consists mainly of thatched-roof huts made of brown mud bricks. Because construction of oil-field facilities had obliterated some of its fields and wild fruit trees, Danmadja was awarded collective compensation as well as payments to individuals. After some debate the people had decided they wanted a covered market to sell their produce—rice, peanuts, millet, sesame, beans, and cassava. GTZ hired a local contractor to build a simple but sturdy structure of metal shelters.

But the new market was not being used, for reasons that were hard to pin down, and its green-painted struts were already showing signs of rust. Among the explanations advanced by Chief Daniel Assyo and a group of his villagers, three stood out: The covered spaces were fewer than agreed; the contractor had walked off with the keys to the new market's public lavatories; a local senior chief had failed to inaugurate the project.

With Esso executives looking on, Honke betrayed his impatience.

"People must use this market, otherwise it serves no purpose," he told the villagers, promising to send an engineer the next day to complete the finishing touches.

As we drove off, I asked him about his impressions of our visit. "When I first came here, I found people's expectations about the oil were incredible. They believed that the money will fall from heaven like manna," he said.

There were some mind games going on, that much was evident, and one strategy I encountered among local people throughout the oil fields was never to let the consortium think it had done enough. The psychology was clear: Keep up the pressure because this moment, when one of the world's richest corporations is

S A H A R A
SENEGAL
BENIN
8.2
Abuja
2.4 million
NIGERIA
35,255
N'Djamena
0.2
CHAD
900
DARFUR
0.3
SUDA
563
Chari
Logone
Laï
Doba
Kayrati
Komé
Dahmadja
OIL PIPELINE
0.03
CÔTE D'IVOIRE
100
0.006
GHANA
16.5
Abidjan
Afiesere
Goi
Niger Delta
0.07
CAMEROON
400
Kribi
EQUATORIAL GUINEA
12
0.3
Gulf of Guinea
SAO TOME AND PRINCIPE
0.2
GABON
2,499
0.2
CONGO
1,506
0.03
DEMOCRATIC REPUBLIC OF THE CONGO
187
CABINDA (Angola)
1.0
ANGOLA
5,412
0.03
SOUTH AFRICA
15.7
0.3
Daily production in millions of barrels, 2004
GHANA
16.5
Estimated reserves in millions of barrels, 2005
Oil field
Oil refinery
Where the Oil Is
In sub-Saharan Africa's biggest producers—Nigeria and Angola—oil has bred corruption, poverty, and war. In Chad the World Bank, NGOs—and local people—hope oil will promote development and easier lives.
38%
U.S. and Canada
1.5 million
35%
3.8 million barrels of oil exported per day
Asia-Pacific
1.3 million
20%
Europe
0.7 million
5%
Latin America
0.2 million
2%
Africa
0.09 million
Three factors—rising global demand for oil, increasing deepwater reserves off West Africa, and threats to oil supplies from the Middle East—have pushed both North America (mainly the U.S.) and Asia (mainly China) to import more oil from sub-Saharan Africa.
Worldwide reserves, 2005
AFRICA 8%
(46% sub-Saharan)
MIDDLE EAST
57%
U.S. and CANADA
15.5%
L. AMERICA
9%
FORMER U.S.S.R.
6%
ASIA-PACIFIC
3%
EUROP
1.5%
SOURCES: BRITISH PETROLEUM STATISTICAL REVIEW OF WORLD ENERGY; INTERNATIONAL PETROLEUM ENCYCLOPEDIA. RELIEF DATA: TOM PATTERSON, NATIONAL PARK SERVICE. NG MAPS

among us, making barrels of money but spending it freely, may never come again.

If the preparation requirements for Chad's oil industry were rigorous, the same can be said for its routine operations, which are subject to a prodigious panoply of safeguards and firewalls. A panel of international experts scrutinizes the World Bank's involvement in the project, reporting directly to the bank's president. A government technical committee and a host of foreign and local NGOs keep beady eyes trained on revenue flow, pollution levels, oil production, emissions, dust, compensation, job equity.

Perhaps most important of all there is the Collège de Contrôle et de Surveillance des Ressources Pétrolières, a watchdog committee whose job is to monitor government expenditures on priority needs like schools, hospitals, and roads.

"The nice part is that we are starting with a sheet of clean paper in Chad," Ron Royal, a veteran oilman from Canada and president of ExxonMobil's Chad operations, told me after a tour of the state-of-the-art facilities at Komé Five Camp. "The world changes, and there is an undercurrent of transparency that is coming, and as long as there is a level playing field, we are fine with that."

Royal was raising the key question on a lot of minds: The consortium operating in the Doba fields is locked in with the government and the

"Oil is a complicated domain. These oil companies are giants and monsters which can crush you."

World Bank in an arrangement that should greatly reduce corruption, but will the same regime apply if, as seems a good bet, the consortium or other oil companies find new exploitable oil deposits under Chad's 495,755 square miles? Or will the key parties adopt the antisocial ways of Africa's other producers, which must be cheaper for the companies and are certainly more lucrative for the local elites?

In other words, will the Chadian experiment fail at the first challenge?

HOPING FOR AN ANSWER, after a shortish wait in his antechamber, sunk in the soft depths of a well-used sofa, I was shown into the office of Chad's oil minister, Youssouf Abassalah. No computer was visible in the long room, nor did I see one elsewhere in the bare-walled ministry in N'Djamena, the capital. I wondered how the minister and his officials could possibly be keeping up with the 24-7 pace of the world oil business. But holding that thought to myself, I asked Abassalah whether the government would stick with the same revenue management system that it had with the consortium.

ED KASHI

Oil pipelines like these bisecting Okrika, Nigeria, have for years carried the Niger Delta's wealth to a federal government that gave little back. Recent reforms awarded state governments in the delta 13 percent of their oil revenues—over a billion dollars a year. But rather than funding schools or clinics, the windfall sparked violence. Armed with guns bought with stolen crude, militias now battle over oil money.

[illegible] that Chad's [illegible] helps local people, Roman Catholic [illegible] over the oil producing region around Doba. [illegible] Says Monseigneur Michel Russo [illegible] of Doba. "They get nothing—except the [illegible]

ESSO

I reminded him about the intemperate and anonymous attack on the oil companies, accusing them of ripping off Chad, that had been issued in a communiqué from the presidency a few months before and that had set the alarm bells ringing in Houston.

Abassalah picked his words. He said the government would honor the principle of using oil revenue to combat poverty, although the precise form might change in future agreements. But he went on to say that 18 months after production began, the benefits of oil were coming through very slowly. He noted unhappily that before the price of a barrel was shared out, $20 had already been deducted for transporting it and discounting it because of its unsuitability for most refineries.

"What reaches the Chadian state is really minimal compared with the people's expectations."

Chad is still one of the poorest countries on Earth, and N'Djamena is one of the worst-kept cities in Africa, which is saying something. If the municipality pays people to do refuse collection, its agents are missing in inaction. The microweight plastic bags that are the bane of the continent are so entrenched and ubiquitous here that they seem to grow out of the sandy soil, like billowing weeds.

One day Doba might look more like an oil industry capital, in the Houston or Aberdeen mold, if not on their scale. For now, it has one long street, lined on both sides by wooden stalls and kiosks selling grilled meat, Gala beer, used tires, and other bits and pieces. It has no paved road, no Internet café, and minimal electricity. There are fewer than a dozen gas stations in the whole of Chad, and Doba hasn't got one of them. Like everywhere else, roadside vendors sell Nigerian gasoline from glass flagons, using

PASCAL MAITRE

An oil spill last fall near Goi, Nigeria, fouled waters where boys bathe. Shell Oil blamed the slick on sabotage, a major cause of delta spills. Other causes: theft and corroded pipes.

plastic hoses and suction to get it into your tank. A 40-minute drive away at the consortium's KFC, nearly 200,000 barrels of oil race daily down the pipeline, and giant power plants feed the oil operation 120 megawatts of power—more than five times Chad's entire national capacity.

As night falls, the contrast is not lost on Doba's residents when they light their candles and kerosene lamps.

Sometimes knowing a place over a long period helps keep things in perspective. During my two previous visits to Chad, in 1982 and 1990, I hadn't had time to count plastic bags or quiz the government of the day about its budgetary management.

In fact, on neither occasion had there been a government.

Instead of arriving on a direct Air France flight from Paris, as I had this time, I twice limped through a 24-hour endurance course from my base in Abidjan in Côte d'Ivoire, nervously entering N'Djamena aboard a dugout canoe after being punted across the shallow Chari River that there marks the border with Cameroon. Each time, I was painfully aware of being a day late for a Chadian regime change, one of the classic features of Africa in the 1970s and '80s.

In 1982 it was the turn of Goukouni Oueddeï to leg it, chased over the Chari by Hissène Habré. Eight years later Habré was forced to make the same one-way journey, after a cash pickup at the central bank and a visit to dungeons in the presidential palace where his personal guard is reckoned by Amnesty International to have polished off more than 300 political prisoners. By the time my BBC colleague and I had panted and puffed into the beat-up city, Idriss Déby's turbaned Zaghawa tribesmen had things under control and were sitting on looted sofas at their checkpoints.

Déby has been president ever since. There is a new bridge across the Chari, and much of the masonry that was pockmarked by rounds from heavy machine guns has been replastered. There have been coup plots, real and rumored, but none so serious that Déby's boatmen had to prepare the river barges. He has kept out of the fighting in Darfur, no mean feat since his Zaghawa kinsmen are among the belligerents. To cap it all, the oil in the south that everyone had known for years was waiting patiently underground for the fighting to stop, has started to flow.

It is no longer risible to talk of a Chadian state. But in the tripod with the World Bank and the oil companies, one leg is still looking distinctly wobbly. It's the one stamped Government of President Idriss Déby. How much weight can it take?

"Strangely enough it is when the government's pockets are filling up with oil money that it is unable to pay teachers' salaries."

THÉRÈSE MÉKOMBÉ is a women's rights campaigner who in 1999 supported calls by Chad's NGOs for a two-year moratorium on the oil project on the grounds that nobody was ready for it—neither the government nor civil society nor the southern peasants who would be most affected. The appeal failed, and the next year, after the World Bank gave the project its formal blessing, construction blasted ahead.

Mékombé comes across as a practical, hands-on sort of person when we meet in one of N'Djamena's two international hotels during the baking heat of a January afternoon. She wears a yellow robe and a matching headdress.

I can't help making a positive mental note when I see that she drives a small car. As one of the members of the Collège de Contrôle, the oil revenue oversight committee, she is one of the most influential people in Chad.

"We know what has happened in other oil-producing countries—Nigeria, Congo, and Gabon—and their experience of failure is what motivated us," she says.

"As for the NGOs, they are at least some deterrent to those who seek to profit from our naïveté, our incompetence, our lack of time to prepare for the arrival of oil."

Like a lot of Chadians, Mékombé's education in petroleum matters has been less a fast learning curve than a jump jet's vertical liftoff. But even after all the seminars and foreign field trips, the briefings with oil traders and World Bank economists, some numbers still don't seem to add up. There's always that nagging feeling you might be getting ripped off.

"Oil is a complicated domain. These oil companies are giants and monsters which can crush you," Dobian Assingar, Mékombé's colleague in the collège, tells me during a break

from teaching at a packed anticorruption workshop in N'Djamena. Like Mékombé, Assingar, who's a lawyer, emerged from the ranks of prodemocracy NGOs, where distrust of Déby's regime is intense. Real power is perceived as the preserve of the president's family and clan and, more generally, of Muslims from the desert north at the expense of "useful Chad," as the French colonialists used to call the south.

PASCAL MAITRE

Oil money built the monumental Central Bank of Nigeria in Abuja (above) and helped decorate the throne room of Okrika's King Oputibeya X (opposite). Yet most Nigerians survive on less than a dollar a day. Oil in poor countries has been called the "devil's excrement"—a curse Africans are still struggling to turn into a blessing.

In his courtroom baritone, dressed with the weekend elegance of a Parisian intellectual, Assingar singled out some of the challenges the collège is up against. When the president's older brother, Daoussa Déby, is the director-general of Chad's biggest road construction company, which in turn is bound to bid for some of the most lucrative contracts the oil proceeds are intended to finance, the risk of political pressure is clear.

Assingar says that because the oil money from the consortium is ring-fenced and next to untouchable for now, well-connected people are getting frustrated and dipping greedily into other pots. Government receipts from old-fashioned sources like local taxes and customs duties plunged in 2004. "It is as though those resources became the pocket money of a group of people," he says.

Even before the money started flowing in, Chad ranked 142 in Transparency International's Corruption Perceptions Index for 2004. Nigeria occupied 144th position. Only two countries, Bangladesh and Haiti, fared worse.

But when asked to assess the collège's efficacy in 2004, the first year oil revenue hit the treasury coffers, Assingar has a sheet of paper showing that a respectable 76 percent of the funds under its control had been allocated to approved projects. He would see how things pan out in 2005 before deciding whether to remain a member.

"But for sure, as soon as any abuses become flagrant, I shall resign."

Unconvincing explanations came out of the government early this year when Chad's teachers threatened to strike, citing three months' salary arrears, a far longer default than they had suffered in the years before oil.

"Strangely enough it is when the government's pockets are filling up with oil money that it is unable to pay teachers' salaries," said Ange-Gabriel Soulassengar, then a lay worker with the Roman Catholic Church, the institution that has emerged as the oil project's sternest critic in Chad.

SOULASSENGAR was based at the bishopric in Laï, a little town on the eastern bank of the Logone, a wide river that winds sluggishly through the south, blessing its fertile plains and marshes. There is talk of oil being nearby, and although ExxonMobil and the Canadian company EnCana have yet to announce any commercially viable finds, the local people and their clergy are already worried about the prospect.

The 60-mile drive north from Doba to Laï took me three hours. Rice paddies and fields of sorghum stretched toward the Logone, and longhorn cattle ambled by, kept in line by the tapping sticks of Fulani herdsmen. Mango trees and rôniers, the sturdy local palm trees, gave shade and shelter. The villages were busy and tidy, with brick huts and earthen grain stores enclosed by walls of matting in square family compounds.

But if this paints a picture of bucolic peace, it would be a serious distortion. Reality for the people of southern Chad is a life expectancy of 48, cut short by malaria and increasingly by AIDS. It is also constant fear of the intentions of anyone armed and in uniform, no choice of what economic activity to pursue apart from

farming in a fickle climate, and powerlessness to negotiate a fair price for cash crops.

And the word wafting up the sandy track from Doba is that if oil is discovered, the 15,000 people of Laï should not assume that their existence will change for the better.

Father Alexandre Canales Maza has been a missionary in this area since 1978, when he arrived from Spain at the age of 30, dispatched by the Comboni Missionary Society. Every three years he goes home to Santander to see his family, but his life is here, in southern Chad. When he first arrived, Canales worked as a teacher. Soulassengar was a schoolboy in a neighboring town, and when I visited, 25 years later, they were colleagues in the Laï branch of the Catholic Church's Justice and Peace Commission.

"People's eyes are opened," Canales said. "It is known that Doba wasn't really ready for the oil. No oil has been found at Laï yet, but whatever happens, there will be consequences for us. We're making sure that the people don't lose out and that they know how to make their demands."

When I arrived in Laï, he and Soulassengar had just hosted a workshop in the town about —surprise, surprise—oil. The meeting drew 140 people, including representatives of the oil companies, the Collège de Contrôle, local peasants, and some of the key NGOs. It achieved its main purpose, which was to set up a grassroots network to defend the interests of the local citizenry.

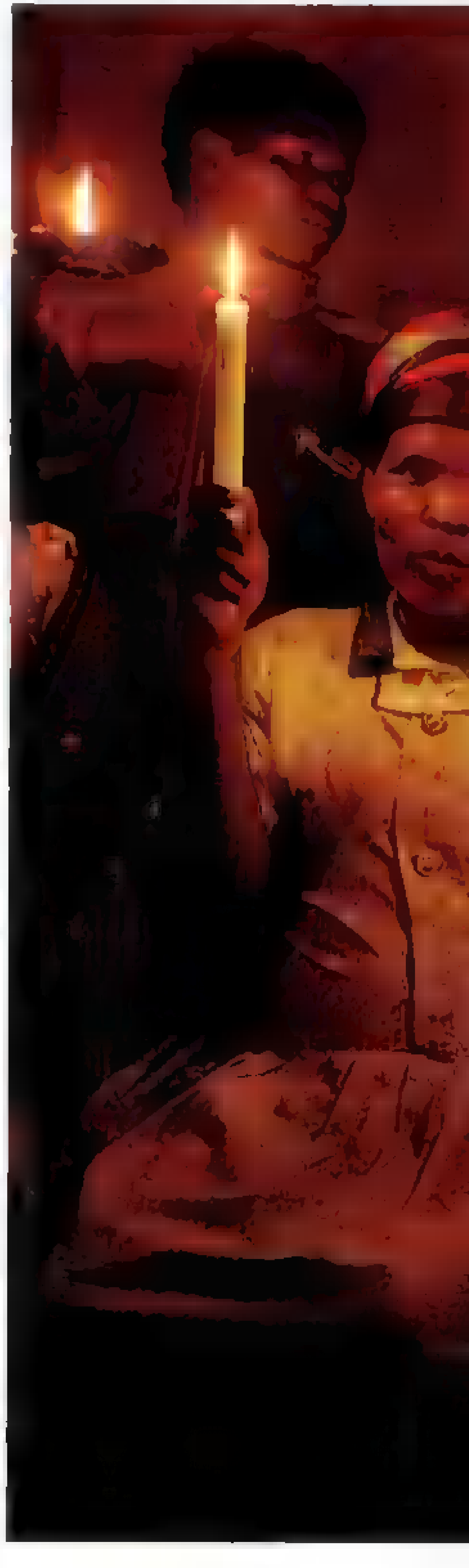
ED KASHI

"The population is saying, 'We are the owners of this land, these trees, this fishing ground, so just wait a moment!'" was how Soulassengar summed up the mood.

Who knows? Maybe the oil companies will break the habit of several lifetimes and listen carefully to the peasants of Laï. The whole world will be a better place if they do. ☐

CURSE OR BLESSING? What does "oil rich" mean to the developing nations of Africa? Can fields of black gold provide solutions instead of problems? Join our online forum and share your thoughts. Then see a photo gallery with tips from the photographers at **ngm.com/africa**.

"My name is Nomfumaneko Yako. I am fifteen years old. I started to be sick in May last year."



Night vigil: When Nomfumaneko (front row, middle right), a teenage girl with AIDS, took her first dose of potentially life-saving antiretroviral (ARV) medication, her extended family gathered to show support. Here in South Africa's rural Lusikisiki region, HIV/AIDS has become a way of life—and death.

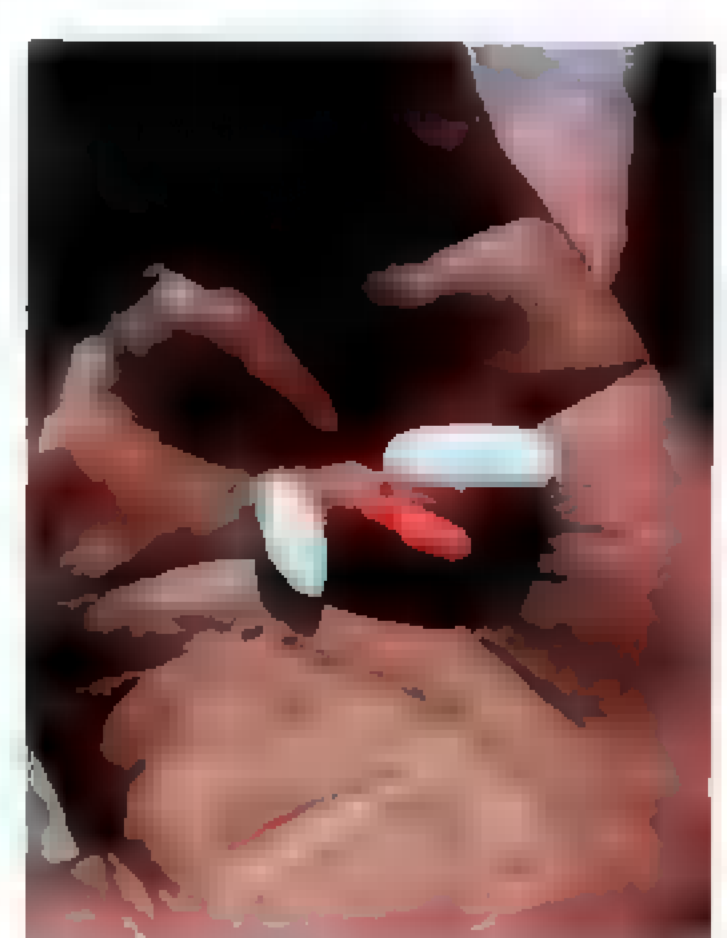
NOMFUMANEKO CONTINUES... *It was said I must have an HIV test. It was positive. My heart was very painful at the news, but I did not cry. The nurses told me I must not be scared and that if I take my medication, I am going to get better.*

For a while I felt stronger, but now I cannot do anything. I am very weak. It is difficult for me to walk even a few steps. My sister helps me to wash. My family is supporting me. They come to sit with me every time I take my medication. I feel very happy because they show me that they really love me.

I want to go back to school when I am better, so I can learn to be a nurse. My dream is to help other people who are very sick in the same way.

Last November Nomfumaneko died.
Her Aunt Ntobile Nkosi:

It was very bad for us because we had hoped that she was going to live long after she was given the new pills. When I am alone, I just think of her. I remember she was a beautiful child, and I also remember when she was so sick and had so much pain, here at my house.



Across sub-Saharan Africa the HIV/AIDS statistics are terrifying: more than 26 million people living with the virus, 2.3 million deaths a year from AIDS-related illnesses. For 12 years I've documented the effects of the disease on individual Africans, their families and communities. Over time it's become clear to me that my photographs alone can't convey the human reality of the pandemic. These days I travel with both a camera and a recorder so people can tell me in their own words how HIV/AIDS has changed their lives.

The South Africans telling their stories in these pages are from Lusikisiki, a rural region in the Eastern Cape Province, where huts cradle in the creases of green hills. Poverty has always plagued the area, and now the pandemic has further complicated survival. Yet in some ways the sufferers here are more fortunate than most Africans grappling with the disease. In the past two years nearly 800 people in Lusikisiki have been treated with antiretroviral (ARV) drugs. The drugs are administered by Siyaphila La, "we are living here," a joint project of the Nelson Mandela Foundation, Médecins Sans Frontières (Doctors Without Borders) South Africa, and the local health department.

Siyaphila La is proving wrong the widely held idea that the three-pill drug therapy used by millions of Westerners but only 11 percent of Africans with AIDS is too expensive and too complicated to administer in poor African communities. The project relies on nurses in clinics rather than on doctors in hospitals, on inexpensive generic ARV drugs, and on the commitment of patients and families to the daily treatment regimen. Siyaphila La is also challenging the social stigma associated with HIV/AIDS by changing perceptions. Instead of dreading the disease as a killer—something to be denied rather than faced—the people of Lusikisiki now see it as a manageable chronic illness. Patients, as well as their families, medical staff, and others in the community, wear T-shirts with an HIV-positive logo. The openness with which people here confront their condition has given them a strength and bravery I find humbling.

The word Lusikisiki is meant to mimic the sound of wind rustling reeds. Perhaps that wind will soon be heard throughout the continent.

TEXT AND PHOTOGRAPHS BY GIDEON MENDEL

MY NAME IS NOZAMILE NDARAH. *I am 22 years old, and I have four children. Last year I decided to get an HIV test because I had back pains, headaches, and diarrhea. When they told me I was HIV-positive, I was very sad. If I die, I thought, who is going to care for my children?*

I phoned my husband, who works at a gold mine, to tell him this news. He then told me he was HIV-positive as well and was already getting ARV treatment from the mine hospital. I was very angry and asked him why he came home with such a big disease when I had small children to bring up. He said he was afraid to tell me that he had this disease.

I decided that I wanted to have all my children tested for HIV. The AIDS counselor took a drop of blood from their fingers and put it on a small cardboard strip. Then we had to wait 15

minutes to see how many lines appeared. Two lines means HIV-positive, but all my children had only one line. They will be able to lead healthy lives.

I have started to attend the support group at Xurana Clinic, and I like going. Every time we open with a prayer and sing many songs. I was also part of a big church service in my village, where I was called forward for a special blessing. I was happy to receive such a blessing in front of so many people.

I have been taking ARV pills for two months now, and I am free in my heart. I can take care of my children, clean my house, look after the goats, fetch the water, cook the food. I have decided to tell everybody that I have HIV. I want to live a better life, so I don't want to be hiding something like this.

A World Distorted by AIDS

Africa dwarfs other continents in this cartogram, where each country's size reflects the number of people with HIV/AIDS. Southern Africa has been hardest hit—in Botswana one in five people is infected.

- Number of people worldwide with HIV: **40 million;** number in sub-Saharan Africa: **26 million**
- Percent of HIV-positive people age 15 to 49 worldwide: **1.1 percent;** percent in sub-Saharan Africa: **8 percent**
- Number of people in sub-Saharan Africa contracting HIV daily: **8,500;** number dying of AIDS daily: **6,300**
- Number of children under 18 orphaned by AIDS worldwide (as of 2003): **15 million;** number in sub-Saharan Africa: **12.3 million**
- Number of HIV-positive South Africans: **5.3 million, more than any other country in the world**
- Percent of pregnant women in South Africa who tested positive for HIV in 2004: **27.9**
- Number of South Africans needing ARV drugs to prevent progression of the illness and death: **983,000;** number receiving medication: **117,000**
- Annual cost of three-drug, generic ARV regimen per patient in Lusikisiki: **about $650;** cost per patient for ARV drugs in the U.S.: **$10,000 to $15,000**

VOICES OF THE STRICKEN Against the backdrop of Gideon Mendel's images, hear Nomfumaneko, Zamokuhle, and others tell their own tales of coping with this modern plague. You'll also hear Mendel's reaction to the people of Lusikisiki, recorded in his audio diary. Go to **ngm.com/africa**.

MY NAME IS ZAMOKUHLE MDINGWE. *I am seven years old. My mother died last year, and I was very sad. She had AIDS, and I got it from her because she didn't know she had AIDS and she breast-fed me. Now I stay with my grandparents and cousins. They take care of me.*

Every morning when I wake up, I take my pills. I have been taking them for some time now, and I feel stronger. I can play ball better and run faster. At school I am finding I learn better. I am happy. I think I will live a long life.

On World AIDS Day I went with my granny to a big meeting. I was told to stand and hold a candle. I told them that every day I am taking my pills. I was shy in front of so many people, but I was proud too, because we went there with some pupils from my class. They came to see me talk. It was nice to travel with them in the bus. We were singing all the way. I think they love me.

His grandmother Mathembisile Mdingwe:

After these months of taking pills, Zamo is stronger. When we took him to the World AIDS Day meeting, I was very proud to see him speak. I saw that some people were crying when they heard what he was saying. I was so happy that I stood up and danced with the other people.

Sometimes when I look at Zamo, I am sad, because I think of his mother and all the pain she had with her disease.

AFRICA

IN CENTRAL AFRICA, WAR AND INNOCENCE COLLIDE IN A TALE OF PYGMIES, REBELS, SORCERERS, AND DREAMERS.

Who Rules the Forest?

Though blind, young Apatite Vecant (foreground) must see with other senses as he endures rites of manhood alongside his peers, learning to survive in the Ituri forest.

THE THIN WHISPER OF SKIRTS *dissolves into the rain forest as boys trail their elders on their way to a hunting camp. The Mbuti are one of several Pygmy groups still following semi-nomadic traditions in the Democratic Republic of the Congo.*

GIRLS DAUB EACH OTHER *with clay in solidarity with the boys' initiation into manhood. Pygmies often beautify their bodies with paint, scarification, even tooth chipping.*

THE SOUND OF PIPES *fills an Mbuti camp as men play by the fireside at dusk. Often whittled on the spot, each instrument is cut to play just one note; together they create the music of Mbuti life.*

BY PAUL SALOPEK | PHOTOGRAPHS BY RANDY OLSON

R

The hunt

Rain forests are light-struck places. This comes as a surprise. Countless books and movies would have us believe otherwise. The world beneath a jungle canopy is neither dim, nor gloomy, nor monochrome. It glows with the light of some alien order—a light so improbable it has a dreamed quality, the way colors in dreams can possess actual weight, or create sound, or stop time.

I have looked up, startled, from my notebook to see the forest suddenly electric white: suffused with the calm, almost glacial cleanliness of a fluorescent-lit office. A few moments later, or merely a few steps away, the jungle turns metallic. Falling rain, leaf shadows, the bloodied pelt of an arrowed monkey—all appear dipped in shivery tones of silver. Once, on the steamy banks of the Ituri River, I saw the twilit undergrowth erupt in unearthly constellations of fire: Sunset burned through the pin-holed canopy, and its deep, red laminar shafts spattered the sodden leaves like flecks of lava. Rain forests, everyone knows, are valued for biodiversity. But few credit the kaleidoscopic richness of their light—ethereal and hallucinatory, filtered as though through antique glass, unlike any other in the world.

Right now, at this precise instant, the jungle is blue—rinsed the color of indigo ink diluted in water, its shadows deep as the bluing on a gun.

Musa Yambuka's glistening eyes are stained pale blue. The sweat on his face sparkles star blue. He's an Mbuti Pygmy, a small, perfectly muscled man, crouched with a spear behind the roots of a fig tree, waiting to ambush a forest antelope. (These animals, too, are smoky blue, a fact noted in their Western name, blue duiker.) The moment is a thousand or more years old. The beaters come yodeling through the forest, driving the game before them. Musa tenses, digs in his toes, ready to spring, to slice something's throat. In the canopy, the monkeys grow still, fall silent. I hear an invisible bird flap away.

I have seen this scene 20, maybe 30 times now. We have been traveling together for days, the Mbuti and I, through the jungle of the Democratic Republic of the Congo. Pygmies do things that most humans forgot a long time ago. Like drive cat-size antelope into nets. Or live in adult accord with pain and sudden death. Or mold soccer balls out of the sap from a certain liana. All of this, of course, is interesting. But what distracts me more than ever, what's got me disoriented, even a little spooked—my eyes, these days, seem like borrowed things—isn't what these people do as much as the light they do it in: this miraculous and enigmatic empire of color that only the Mbuti know.

It shifts again.

Musa's ferocious grin shines aquamarine. The drivers approach through a white-hot slab of brilliance that could burn diamonds. Dazzled, I look down at what, apparently, are my hands. In the bottom-of-the-sea sheen of the forest, the skin looks insubstantial. Almost translucent. The hands of a ghost.

I hold my breath.

Maybe birth is like this.

The road Isabella Rossellini could fix (if only she knew about it)

To reach the land of the Mbuti—a 23,000-square-mile greenhouse called the Ituri forest—you must follow men who push bicycles.

This isn't difficult. You will find them trudging, antlike, across the wilds of eastern Congo. Jackknifed at the waist, generally emaciated, their eyes glazed with exhaustion, they manhandle bikes that sag under mountains of goods: bundles of rice and gold dust, women's underwear and bullets, live goats and coffins, jugs of gasoline and cases of Coca-Cola. Some of these cargoes tilt and spill into the mud. Others

bounce wildly down steep hills and explode across jungle trails. No matter. Slowly, with stupefying patience, the cyclists stoop and gather up their battered merchandise; they plod onward, advancing at the pace of a convict's shuffle, rolling their burdens over the belly of a continent.

These are Congo's *toleka* traders.

"We use drugs to keep going," says a scarecrow named Kambale Vivalya.

I meet Vivalya while he is heaving an enormous sack of shoes—cheap plastic shoes—to a gold mine 300 miles away, on the far side of the Ituri.

"I take ibuprofen for pain and Indocin to keep awake," he says. "Otherwise you won't make it. Many people have died on this job. You get exhausted. You go home after a trip. You sleep. You don't wake up."

When we finally part, he shakes my hand politely and wishes *me* luck. I wipe the blood of his blistered palm on my trousers.

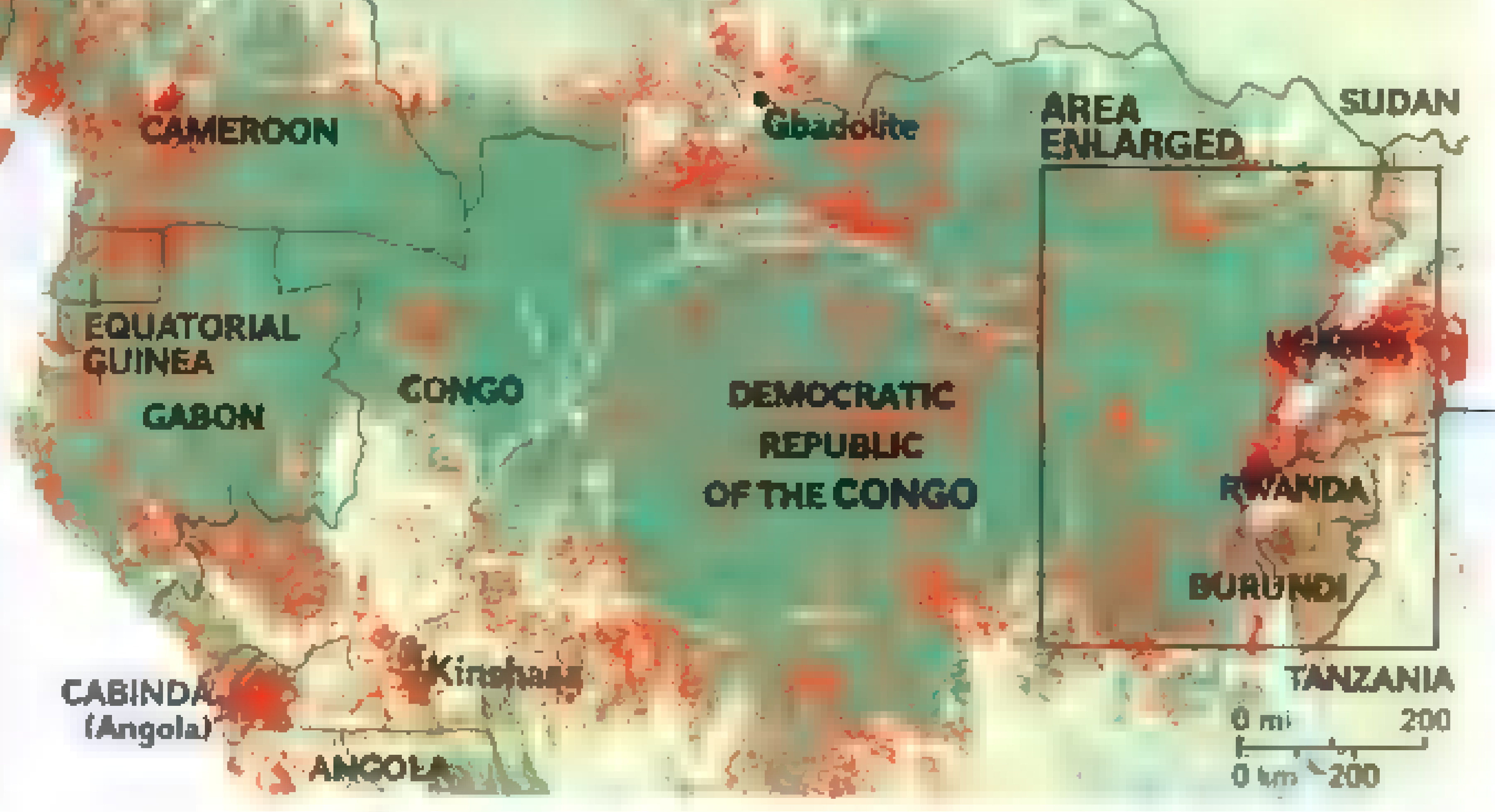
Few countries in the world have collapsed as disastrously by the wayside—regressed so starkly into preindustrial ruin—as Congo. Once called Zaire, the nation was picked clean during three decades of misrule by the dictator Mobutu Sese Seko, then gutted by more than six years of anarchy and civil war. Today Congo is the shell-shocked colossus of central Africa—a country almost the size of western Europe that seems to have sleepwalked into some feverish dream of the post-apocalypse.

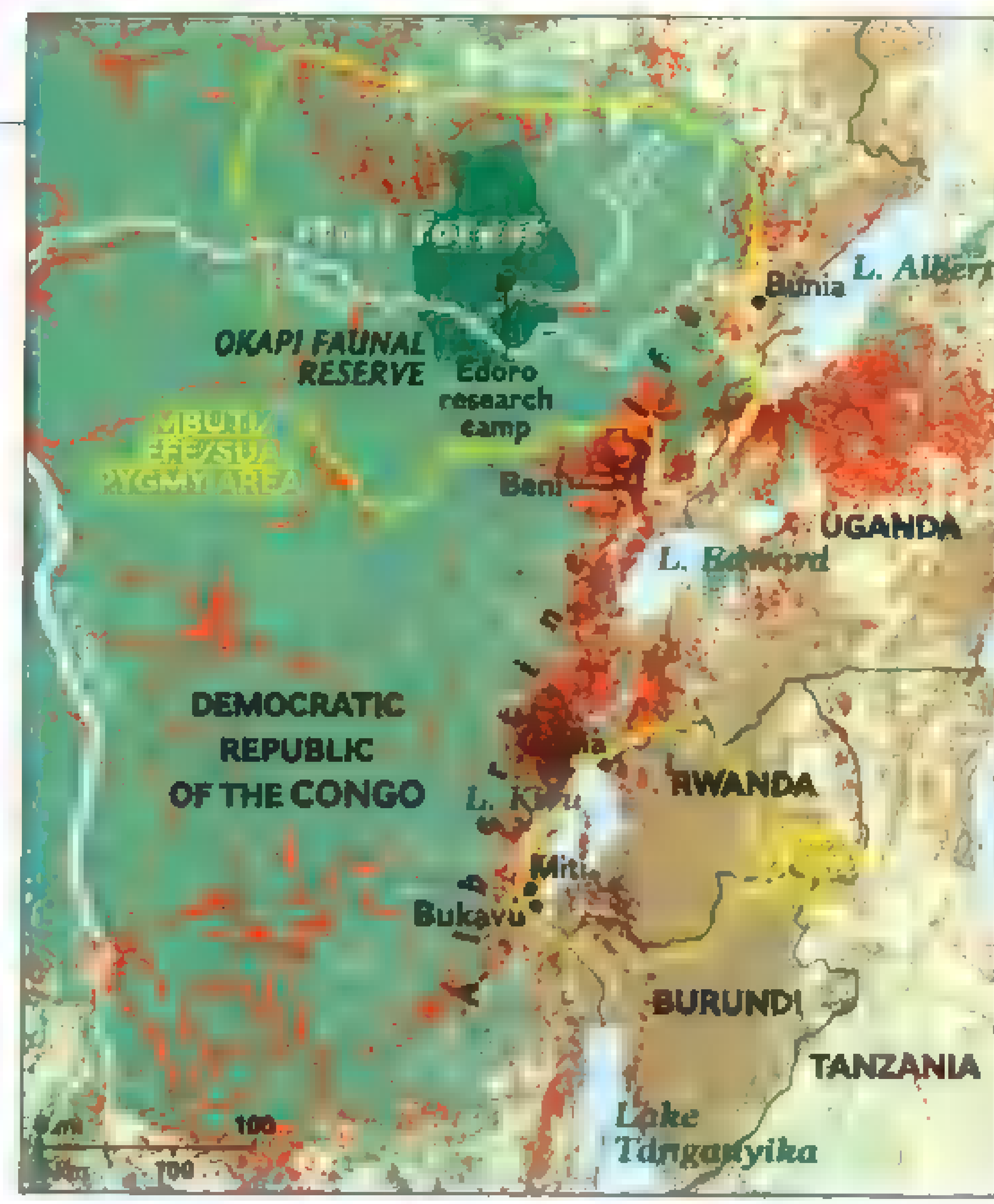
The Pygmies are gaining their independence, which in Congo's feral east means they are free to lose everything.

Nowhere is the decay as surreal as on the roads that span the country's Wild East, a vast jungle where the fighting has never stopped.

What words can be uttered about those roads? Clogged with mud, strangled by bush, reduced in many cases to absurd footpaths, they slither

His most prized possession: An Mbuti hunter carries a net of twined liana bark. The Mbuti drape nets between trees and flush antelope and other game toward them. Meat is exchanged with Bantu farmers for vegetables, grains, and other goods in an interdependent relationship.





Deforestation threatens the central African rain forest. Congo's share, home to thousands of Pygmies, holds riches coveted by both the Congolese and densely populated nations to the east.

Degraded rain forest
Lowland rain forest
Populated area (more than 100 people per square kilometer)

SOURCES: MATTHEW C. HANSEN AND ERIK LINDQUIST, SOUTH DAKOTA STATE UNIVERSITY; BARRY S. HEWLETT, WASHINGTON STATE UNIV., VANCOUVER; TOM PATTERSON, NATIONAL PARK SERVICE; OAK RIDGE NATIONAL LABORATORY LANDSCAN2003
NATIONAL GEOGRAPHIC MAPS

for hundreds of miles through a tropical forest second in size only to the Amazon. They span a landscape where the 20th century has ebbed like a neap tide, leaving behind the detritus of modernity: towns with trees growing from roofs, factories crumbling like Maya ruins, coffee plantations run wild.

The roads are no longer roads. They are Ho Chi Minh trails of survival. And in their shadow-smeared margins the Mbuti can be glimpsed, shy, silent, watchful. In many cases it is their own world, dismantled and repackaged into sellable commodities, which they see passing by. The Pygmies covet, as we all would, the aluminum pots, cigarettes, and manufactured clothing carried by Congo's bicycle caravans. Yet in exchange, loads of timber, wild meat, and gold are streaming out of their forest home along the same tracks—a bonanza of raw materials swindled from the Pygmies by unscrupulous shopkeepers and middlemen. Moreover, the tiny hunters' ancient bonds of trade with local farmers—a quasi-feudal system that swaps Mbuti field labor and forest products for food crops and metal tools—are becoming frayed.

"They are easy to cheat," a roadside merchant says of the Pygmies along the way. "Like children."

In effect, the Mbuti are gaining their independence—which in Congo's feral east means they are free to lose everything to the tatterdemalion parade of pilgrims, many in far worse straits, who trod the dying remnants of the trans-African highways built by the colonial Belgians: the child soldiers in baggy new uniforms supplied by Russian gunrunners; the whores in blood-red ball gowns, bouncing atop toleka men's bicycles; the hollow-eyed refugees seeking sons, daughters, and parents long since vanished into the smoke of civil war; a rabble of small-time loggers, miners, and peddlers; and the howling, genocidal militias daubed with human blood and toothpaste (toothpaste sticks despite the rain and sweat).

I depart the frontier town of Beni at dawn on the back of a motorbike. The driver's name is Willy. He is a stoic in sunglasses. His reflexes—his balance—are things of rare beauty. For 11 brutal hours we penetrate the Ituri. We pass columns of traders who slog head down, sweating, through clouds of butterflies. Stinking bogs the size of swimming pools block the way. It is the worst road in the world.

"Ah, if only Isabella Rossellini knew our situation," an Italian priest says at a mission where I pause to rest. The padre, a veteran of Congo's chaos, explains that Rossellini, the glamorous international film star and daughter of Ingrid Bergman, donates to African conservation and philanthropic projects.

I am too exhausted to speak. Sore-assed, I *can* barely sit at the priest's dining table.

"Rossellini could help fix our road," he persists, "if only she knew about it." But his eyes betray him. He stares wistfully into his pasta. Because, of course, she doesn't know.

The "King of the Imbeciles"

Perusing a copy of *Echoes of the Pygmies,* a foreign-funded Congolese human rights quarterly, I notice the following headline: "THE MLC TRIES TO ERASE PROOF OF ITS CANNIBALISM OF PYGMIES IN THE ITURI."

MLC stands for the Movement for the Liberation of Congo, perhaps the strongest rebel group in the country. Its leader is a pudgy businessman named Jean-Pierre Bemba. In accordance with Congo's 2002 peace agreement, he has joined a weak transitional government as one of four vice presidents. He wants to be president. And he has an image problem: His soldiers are known primarily for eating Pygmies.

More than three million people died in Congo's six years of civil strife, an internal scramble for power that saw one president assassinated and laid Congo open to the invading armies of at least six of its neighbors. The dead consist mainly of civilians. They perished mostly from starvation and disease: the worst human calamity since World War II. Yet, inevitably, it is Congo's lurid tales of cannibalism, its sensational stories of human sacrifice, its ornamental killings, which end up bubbling into the news.

Magical violence makes it easy for journalists to reach for Joseph Conrad's bleak fable, *Heart of Darkness,* every time a Congo headline is required. This fixation on "unspeakable" rites in "darkest Africa" obscures the actual origins of the war: bitter ethnic grudges and endless squabbles over an immense storehouse of gold, diamonds, timber, and coltan—a mineral used in high-tech electronics.

Still, this much is true: The miasma of juju is inescapable in Congo. It is like swamp vapor. Invisible. Pervasive. Soccer teams hire sorcerers to hex their rivals. Prostitutes pay good money for charms that make them irresistible. And in the nation's Wild East, the magic becomes explosive, toxic, like the volcanic gases that are trapped at the bottom of one of its deepest lakes.

In late 2002 rebel forces—led in part by a commander nicknamed the "King of the Imbeciles"—launched a terrible offensive in the Ituri forest. Towns were sacked. Women and girls were raped. Villagers were executed. Yet it was the rumors of cannibalized Pygmies that scandalized the world.

An Mbuti named Amuzati Nzoli, widely quoted in the international press, claims that rebels attacked his jungle camp, cut up his family, grilled them over a campfire, and "even sprinkled salt on the flesh as they ate."

More than three million died. Yet it was rumors of cannibalism that scandalized the world.

I search for Nzoli in eastern Congo. I never find him. He and other "cannibalism witnesses" have been rounded up in the forest by rebel operatives and flown to the capital. There, under tight guard, and in front of television crews hastily summoned to the lobby of a luxury hotel, a stuttering, wide-eyed Nzoli recants his story. Yet no one in Congo believes him. As several Congolese tell me—Pygmies are subhuman. So anyone can eat them.

"Cannibalism here is both an ancient tribal practice and a modern instrument of terror," says one human rights worker with the 16,000-strong United Nations peacekeeping force in Congo. "But the attacks singling out Pygmies are new. The prevailing theory holds that soldiers ate them to absorb their unique forest powers—good vision, tracking skills, whatever."

One night in Beni I stop by a lightless and crumbling hotel. I have come to visit Maj. Edison Mungilima. He is a senior officer with the Mayi-Mayi—a Congolese militia that has battled almost every other faction in eastern Congo, including the MLC. I am curious about his thinking on the issue of cannibalism.

Mungilima greets me affably. He sits out under the stars in a lawn chair, dressed in military fatigues, a leopard-skin cape, and—despite the Congolese heat—a heavy fur-trimmed parka. He answers philosophically.

Fetishism has been part of warfare in Congo since the very beginning, Mungilima says. There is good magic and bad magic. It all depends on the purity of the individual soldier. Mungilima himself is a "liquid fighter," a warrior who can turn himself into water, so that the bullets pass harmlessly through him. Eating Pygmies, however, as the MLC is alleged to have done, is "offensive," he says; at most, a Mayi-Mayi might cut off an enemy's head "to parade around a village as a flag of victory." (This is modesty. One Mayi-Mayi chief "went around with a dried infant around his neck," according to a recent

Life is motion, fluid and free for the Mbuti, who ferry the portable details of their lives from camp to camp and fashion everything else from scratch. Since fire is always needed, the women haul smoldering logs (left), along with knives and perhaps a pot or two packed in a basket. At camp, women pull saplings from the forest to assemble shelters, called endu. *Each hunting lodge houses a single family and shrugs off showers with walls of* mongongo *leaves (below left). The flow of life on the trail stops abruptly upon the discovery of a beehive, and all minds focus on honey. Hunters scale trees with makeshift smoker baskets (below), then descend with dripping combs.*

Lessons of the lash fall on young backs during the nkumbi*, the ritual passage into manhood. For several months Mbuti and Bantu boys, roughly nine to twelve years old, endure daily whippings (left) to toughen them up. Just one of the cultural knots binding Pygmy hunters and Bantu farmers, the nkumbi begins at the behest of a Bantu chief and starts with a festival and the circumcision of each boy. The forest then becomes both classroom and obstacle course (below left), where silence reigns. Normally chatty boys keep quiet by clamping stick-skewered leaves in their mouths (below). These trials don't dampen their spirits, says photographer Randy Olson, who noticed that humor often offsets their hardship. "They laugh so hard they have to hold each other up," he says.*

human rights document.) Mungilima produces a photo album. Stenciled on its cover, in elegant gold script, is the word "Memories." It is filled with war porn, gory battlefield snapshots. As proof of his *dawa*, or magical power, Mungilima presents me with one of the pictures.

Later, under the yellow glare of a lightbulb, I look at it. Mungilima stands in full regalia. A white dog walks by in the foreground. The perspective is odd. It makes the warrior seem shrunken to half-size, as if he were a malevolent elf perched on the hound's back.

When I show this to a Congolese acquaintance, a worldly, educated man who manages an English-language institute, he stares hard. "That," he says finally, slowly, with great care, "is a very dangerous man."

The hunt

Musa the Pygmy has found a honey tree. This is an event. All hunting stops if *asali*, as it is called in Swahili, can be located and consumed.

Among the Mbuti the quest for wild honey is tireless, constant, almost obsessive. They have honeycomb on the brain. It is their favorite food. The honey season in the southern Ituri is measured out according to the cycle of flowering trees—the bees' main source of nectar. In June real honey production begins. This is white honey: Young, virtually transparent and cool to the taste, like a pale wine, or the first breaths of dawn. Later, by August, the honey is oil-dark. Black honey is strong, warm, musky with distilled sunlight and the nectar of tropical flowers.

"We like it all," Musa says unnecessarily. Then he knots together a 150-foot rope of lianas and does what must be done.

He and a hunter named Jolie, who at four feet tall is tiny even by Pygmy standards, shinny some 60 feet up the smooth, fat shaft of the tree to ax a hole in the trunk. The women send up a smoker fashioned from a basket of embers and leaves. Within minutes, to small yelps of anticipation, the combs are lowered like hunks of

A human flood chokes the mud-slick remnants of a highway, the main vein for commerce through the Ituri. Rough and rutted during dry weather, the roads are nearly impassable in the wet season. But rain can't stop the toleka *traders, who push goods hundreds of miles by bicycle.*

gold. Soon the entire band, stuffing their stomachs with pounds of sweet liquid, feels the sugar's glow. The men argue and holler at each other loudly. The women guffaw even louder at sex jokes. Somewhere up among the attic of leaves—30 or 40 feet off the ground—children as young as five or six, smeared with honey, bombed by angry African bees, are chattering with delight.

Tasting rain forest honey for the first time is an unforgettable experience. It goes quickly to the head. Its delicious perfume carries with it the suggestion of a better world. As it seeps directly from the membranes of the mouth into the bloodstream, yielding up its concentrated energy, generously radiating its stored warmth, a single word comes to mind: Yes.

The rift

John Hart, a sunburned American biologist, sits on a veranda in the town of Bukavu, sketching a map of Africa on a napkin. He draws a worrisome fault line that cracks through the very heart of the continent—a tectonic fissure that runs right under his table.

This is the Albertine Rift. It is the westernmost of the famous African rift valleys that began yawning wide some 30 million years ago as the Arabian Peninsula drifted away from the continent. The Albertine Rift is especially beautiful. It shadows Congo's eastern border, cupping a series of enormous, limpid lakes in its belly, separating Uganda, Rwanda, and Burundi from Congo proper.

This rift, Hart points out, also is a human quake zone. It's where francophone central Africa meets anglophone eastern Africa. It marks an economic divide between countries with few natural resources (Rwanda, Burundi) and one that overflows with them (Congo). Moreover, it is a violent ethnic front. The Hutu perpetrators of Rwanda's 1994 mass murder of the Tutsi escaped into Congo's jungles, sparking years of cross-border reprisals by Rwandan forces.

But to Hart, the most troubling divide of all is demographic: Along the Albertine Rift, population densities exceed 1,000 people per square mile; to the west, in Congo's vast, lawless rain forests, it drops to fewer than 10.

"All these people have to go somewhere, right?" he says, gesturing out beyond the farm-scalped hills around Bukavu. "It's inexorable. Unstoppable. This is Africa's last big frontier. All we can do is try to create islands of habitat that the crowds will hopefully flow around."

Black honey is strong, warm, musky with distilled sunlight and the nectar of tropical flowers.

Hart works for the Bronx-based Wildlife Conservation Society. He is an odd mix of bluster and innocence—much like the Mbuti hunters he has lived among for two decades. He is known to chant Pygmy airs while driving. His goal is to protect enough Congolese forest from the advance of small, anarchic logging mills, settlers, and poachers to allow the Pygmies to conduct their nomadic lifestyle indefinitely.

He and other environmentalists are doing this in a postmodern way. They have internationalized the wilds of central Africa.

Imagine, for a moment, that the United States is prostrated by a civil war. Desperate bureaucrats in Washington, D.C., cut off by years of fighting, issue an SOS to foreign green groups: Please help rescue America's fabled national parks! British activists respond by funding the entire budget of Yellowstone National Park, where gangs of neo-Nazis are holed up, machine-gunning the last buffalo. Japanese wildlife experts, meanwhile, face gunfire while resupplying beleaguered National Park Service rangers at the Everglades, where armed profiteers are peddling real estate. Scores of American rangers have been killed.

This is conservation work in Congo.

"The war has been hard," Hart says, tipping back a warm beer. "But just wait until things stabilize. Wait until the big loggers think it's safe to move in. That's when the real plunder begins."

Looking up in Miti

Before leaving eastern Congo I drive to Miti. It is a typical Wild East village. Its road is ridiculous. The dozy market sells bush meat. Customers carry away their dead monkeys like valises; the animals' tails, lashed to their necks, form convenient handles.

There is a military checkpoint—the usual string tied across a street—where a 12-year-old with a Kalashnikov struts up to the car, shoves the muzzle of his rifle through the window, and demands a thousand-dollar "security tax"

Mbuti girls seem lost in an alien world during a visit to a market near Beni. When plucked from its forest roots, Pygmy culture crumbles. "Without the forest, the Mbuti become a kind of pauper group," says conservationist Terese Hart. Some Pygmies work for poachers or loggers to survive.

to let me pass. He settles for a Ugandan cigarette.

I have come to see David Bisimwa. Or rather, his famous helicopter.

Bisimwa is a slight, intense, energetic man of about 30 with the syrupy eyes of a dreamer. He is a self-taught artist and inventor. He is also a member of the Bashi tribe, farmers who have long coexisted in the rain forest with Congo's Pygmies. Only in Miti, the forest is mostly gone, gobbled up by settlers. The Pygmies, here called the Twa, no longer hunt to survive. They are farm laborers. And the children of the old Bashi, squeezed by land hunger, now look beyond the depleted soils for inspiration.

Bisimwa has built, by hand in the Congolese jungle, using scraps of metal, pipes, and wire, a life-size replica of an old Sikorsky helicopter. He copied it out of magazines. When I first see the chopper beside the potholed road, two barefoot farmers are sprawled in the shade of its fuselage, absorbed in eating stalks of sugarcane.

"It's for research," Bisimwa explains. I stare at the machine dumbstruck. Faced with an artifact of such frustrated longing, I can't think of anything to say.

"Aeronautical research," he adds helpfully.

Finally, I ask him who the pilot is.

"I made it," Bisimwa says proudly. "I'll fly it."

Bisimwa says he has tested his helicopter only once, the year before. Powered by a borrowed Volkswagen engine, the rotors had raked up an impressive cloud of dust and spooked the local livestock—but, alas, to no practical effect. The racket is still commented on with awe in the village. Bisimwa had run out of money for further trials. A friend had reclaimed the engine and bolted it back into his car.

Bisimwa is one of Congo's stranded intelligentsia. His life's highlight was an all-expenses-paid trip to Japan to illustrate a book about gorillas. That was many years ago. Now, like thousands of other educated Congolese trapped in backwaters—many of them students who had ventured abroad during the long *pax corrupta*

of dictator Mobutu—he finds himself reduced by war and poverty to rustic irrelevance. These doomed cosmopolitans are everywhere in Congo. During the war, in the rebel-held town of Gbadolite, I met a Belgian-trained chef who had prepared elaborate state banquets for President Valéry Giscard d'Estaing and other dignitaries. Clad in grimy shorts and scuffed wing tips—nothing else—he was hawking boiled eggs from a roadside stall. Earlier, on the Congo River, I shared a leaky dugout canoe with a linguist who, for hour after delightful hour, recited the works of the poet Robert Frost. (Whenever gunmen boarded to rob us—a frequent occurrence—he jabbed at them with a multicolored umbrella, bleating indignantly, "But I am a *professor!*")

What lies ahead for Congo's outlaw east?

Africa is the most unpredictable continent in the world. Yet no African nation confronts a future so unscripted, so fraught with disaster and sheer possibility, as the misnamed Democratic Republic of the Congo. Will war resume and Congo shatter into smaller, squabbling states? Possibly. Can the frail but hopeful peace last, allowing Congo finally to put its fabulous riches to work? Conceivably. Everything is so unclear, so unfathomable. An election scheduled for June 2005—the first truly democratic ballot since independence from Belgium in 1960—has been postponed for at least six months. But UN experts warn that more than 100,000 rebels, bandits, militiamen, soldiers, and assorted other killers have yet to disarm. And the ethnic and political rumbling along the rift won't likely stop with a mere presidential poll. So with astonishing patience and good humor, millions of people in the center of Africa hold their breath.

Waking up in their kingdom of trees, the Pygmies peek out warily into the morning's half-light. The toleka men's eyes flutter open to yet another day on the road. A rebel soldier sits up abruptly, as from a nightmare, and reaches for his gun. Will they all see the world they are expecting? Or will a gigantic chasm open up at their feet—an abyss that plummets to the very core of the Earth, into which they all will shortly tumble?

David Bisimwa, a visionary in flip-flop sandals, the lone Wright brother of the Congolese wilderness, has conquered such paralyzing uncertainty. He never looks down; he locks his eyes on the clouds.

"Just wait until things stabilize. Wait until the big loggers think it's safe to move in. That's when the real plunder begins."

The hunt

The sky is cleaving apart. It calves like a glacier—big, noisy chunks of atmosphere shearing off, crashing into the forest with reverberating booms. Gusts of cold air, like that of a refrigerator, rustle through the canopy, dislodging a confetti of leaves. Musa the Mbuti squints up, mutters *ah-ah-ah* at the storm.

Pygmies dislike rain. It is not only the clammy discomfort of moving through a damp forest. Water weakens the hunting nets. Antelope wriggle through the wet weave of liana bark like fish. Musa coils his net. He hulloos his farewell to the other hunters—a sound that is itself watery in the suddenly darkening jungle.

Darkness. It is not necessarily feared by the Mbuti. They have a feeling about it. Whatever the forest brings cannot be bad. Sometimes they sing this song over their dead:

There is darkness upon us;
Darkness is all around,
There is no light.
But it is the darkness of the forest,
So if it really must be,
Even the darkness is good.

Musa fires up a leaf-rolled marijuana joint. For fatigue. He passes it to Mayuma, his wife. She grips a slain duiker by its rear hooves—a small, jewel-like animal. Its dead eyes shine, and its hooves are not much bigger than a man's thumbs.

Smoking, they wait for their children to gather, and Musa holds Mayuma's gnarled left middle finger in his calloused right hand. A pleasant silence. They will sleep tonight in a small domed hut of *mongongo* leaves. Such huts are everywhere in the Ituri forest. They begin to decay into piles of powdery frass almost as soon as they are built. The Pygmies have erected them since the time when the forest was born. They will continue to do so for as long as the forest lasts.

INTERACT WITH AFRICA Experience the "miraculous and enigmatic empire of color" surrounding the Mbuti Pygmies with narration by photographer Randy Olson. Then join our forum: Can Africa's final frontier be preserved? Go to **ngm.com/africa**.

LOGGING CAMPS *appear like lesions in the Ituri, though pervasive lawlessness and violence have kept big timber companies at bay. For the Ituri, the prospect of peace has a dark side: It could foster more cutting and attract settlers.*

A Hole in the Forest

TWO WILDLIFE CONSERVATION SOCIETY BIOLOGISTS HAVE DEDICATED THEIR LIVES TO PROTECTING THE ITURI.

BY TERESE HART | PHOTOGRAPHS BY RANDY OLSON

LONG BEFORE CIVIL WAR came to the Ituri forest, my husband, John, came to study the Mbuti Pygmies' hunting methods there. I vividly recall a letter he wrote to me while crouched beside a hunting net, describing how the Pygmies had hung the net in a broad semicircle on treelets and lianas, invisible except for little charms suspended in the cords like in a spider web: a nub of porcupine quill, a piece of duiker fur, a bright red button. Just inside his section of the net, and almost as invisible, a Pygmy named Basalito leaned, immobile, deceptively relaxed, listening for his wife's voice amid the women's calls from the far end of the net. Each woman sang and clapped, flushing the game in front of her in the direction of her man's watch.

The women's chorus came closer, and John stuffed the paper pad where he was writing into his waistband and assumed an alert semi-squat. If the women's musical antiphon was broken by a whoop from one of the men, he'd have to dart full-speed to where the animal—probably a duiker—was entangled. He would weigh it, check its age, and collect the rumen contents before they were spilled on the ground by the hunter.

A sudden crashing. The women's harmonies broke into a rapid staccato and skirl. Basalito raised his spear in smooth instantaneous grace. The crashing grew louder. A dark mass, large as a horse, soft brown eyes showing white, broke

Gold fever is contagious in northeastern Congo, where the metal finances local warlords. Would-be prospectors need only old truck parts to get into the business: Wheel rims become mortars and drive shafts are used as pestles. Rocks are smashed and washed by hand in search of yellow flecks.

through not five feet away. John stumbled and fell backward. The animal flashed past, the brilliant white stripes on its receding hindquarters signaling a rare okapi, not a duiker. The crashing grew distant. Then silence. John looked back at Basalito, who stood quietly, spear lowered. His wife, decked in leaves and little else, was now at his side, smiling.

"Why didn't you throw it?" John nodded toward the spear. He knew Basalito's skill; it would have been a sure hit.

Basalito grinned, raised his eyebrows, and tilted his head toward his wife's bulging stomach. "I could not make a hole in the forest, not now. We don't want the little one to fall in."

As Basalito and the men rolled up the net, John wrote to me: "I guess 'the hole' is dangerous if you are a young man with a pregnant wife."

I read his letter and wondered about the Mbuti and their relationship to the forest, dark and seemingly endless. Mbuti babies falling into okapi holes—now that was something to think about.

THAT WAS IN 1975. Back then we couldn't have imagined the holes the AK-47s would leave. Last year, between June and December, an estimated 17 tons of ivory were transported out of the Ituri; that's at least 500 elephants gunned down and maybe as many as a thousand. Mounds of fly-covered elephant meat are sold openly in local markets all around the forest, while okapi pelts and ivory are smuggled across the border to Uganda. The poachers come mostly from the east, and those who arm them are the minions of warlords, profiting from postwar anarchy.

In the quiet of the early 1980s John and I returned to the Ituri to do our doctoral research. We brought our two-year-old daughter, Sarah. Another daughter, Rebekah, was born in the mud and wattle house we built on the east-west road through the forest. John was studying antelope, and I was counting and naming plants.

After our professors had nodded us through our dissertations, we came back again, this time with the Wildlife Conservation Society, our employer of two decades now. We wanted to learn about the okapi, a shy, solitary forest giraffe found only in the Ituri region, along the bend of the Congo River. Over time we caught 25 okapi by digging pits at locations, identified by our Mbuti guides, along barely discernible trails. Bahati, our first female okapi, is the one I remember the most clearly. She was pregnant, and I too was swelling with our third daughter, Ellajo. The pit was eight feet deep, but Bahati's head protruded over the top. That magnificent head was almost as long as my arm, and she exuded a warm, intense, fleeting odor.

I marveled at how efficiently John and Dieu-Donne quieted her, offered her forage, and slipped the radio collar around her neck. They read out vital statistics—height, length, number of molars—and I wrote everything down. They checked the collar: tick, tick, tick on the receiver. Then a leaf barrier was held in front of her while Atoka, Tambo, and Abeli dug out the front of the pit to make a ramp. Bahati clambered out. She took four steps, turned back for a last look at her rapt captors, and galloped off.

One of our findings: Men with steel snares have been stripping okapis out of their home, leaving empty forest. To people outside the Ituri, the value of this forest is not only its animals and trees but the land under it—land that can be made to grow crops and spill out riches. For decades gold hunters have operated mining camps in the region, attracting settlers who cleared more land to cultivate gardens to feed the miners. From the air these holes in the forest looked like the work of ringworms.

Fearing for the survival of the forest, we and others began speaking out. In 1992 President Mobutu Sese Seko's government responded to our pleas by setting aside more than 5,000 square miles of the Ituri forest as the Okapi Faunal Reserve. Immediately we started planning with the Congo parks agency and other collaborators, aiming to contain a small agricultural strip along the road, to maintain large expanses of forest as an Mbuti hunting reserve—traditional methods only—and to ensure an area of complete protection, from which the hunting reserve would be repopulated with antelopes and monkeys.

One evening in 1996, John and I were at our research camp at Edoro, 15 miles north of the only road connecting the Congo River to the borders of Uganda and Rwanda. We had almost finished a two-year botanical assessment of forest plots totaling a hundred acres, in which we'd counted and identified every woody plant down to half an inch in diameter. (In all we found 715 species, including one tree new to science, a swamp giant with thorns.) Through this team

effort—which included eight university-trained Congolese botanists, 20 Mbuti, and six villagers to help with cooking, carrying, and camp chores—we were helping train the next generation of Congolese scientists.

That evening, like every other at Edoro, should have felt peaceful. As the shrill notes of a hyrax faded away, Kayo began plucking his thumb piano, and Tambo, beside him, tapped a hollow accompaniment on an aluminum pot held between his knees. But the Mbuti were alone with their music and laughter. The rest of us were huddled in a tight circle around our only radio, which one of the university assistants was holding up, twisting it right and left to shake out the static. He switched stations, from Swahili to French to Lingala. The story was always the same:

"The Banyamulenge are attacking the refugee camps on the Rwandan border. Mobutu's military is fleeing west. Refugees are fleeing east.

An okapi forages in a wildlife reserve. Scientists hope to save the forest giraffes—found only in Congo—and their shrinking habitat.

Most are heading for Rwanda, but some, even thousands, are climbing the escarpment, fleeing west into the forest."

"They're coming our way," Ewango announced. Everyone continued to watch the radio held aloft. No one said anything more.

I left Congo on the last plane out of Bunia in 1996; John had gone a month earlier with the girls. Over the next six years, as war waxed and waned, John and I took turns returning separately to the Ituri for periods of two to four months. In September 2002, which seemed a quieter time, we both came back together. We'd barely been in the forest a week when messengers brought urgent news: "Get out now."

For the next four months the armies of two warlords battled each other along the road through the Okapi Reserve. In late December a treaty was signed, and once again we returned to the Ituri. We were horrified to find scattered unmarked graves all around our camp. Surrounding villages were empty of female children, their mothers weeping because their daughters had been forced into sexual slavery in military camps on the reserve's borders.

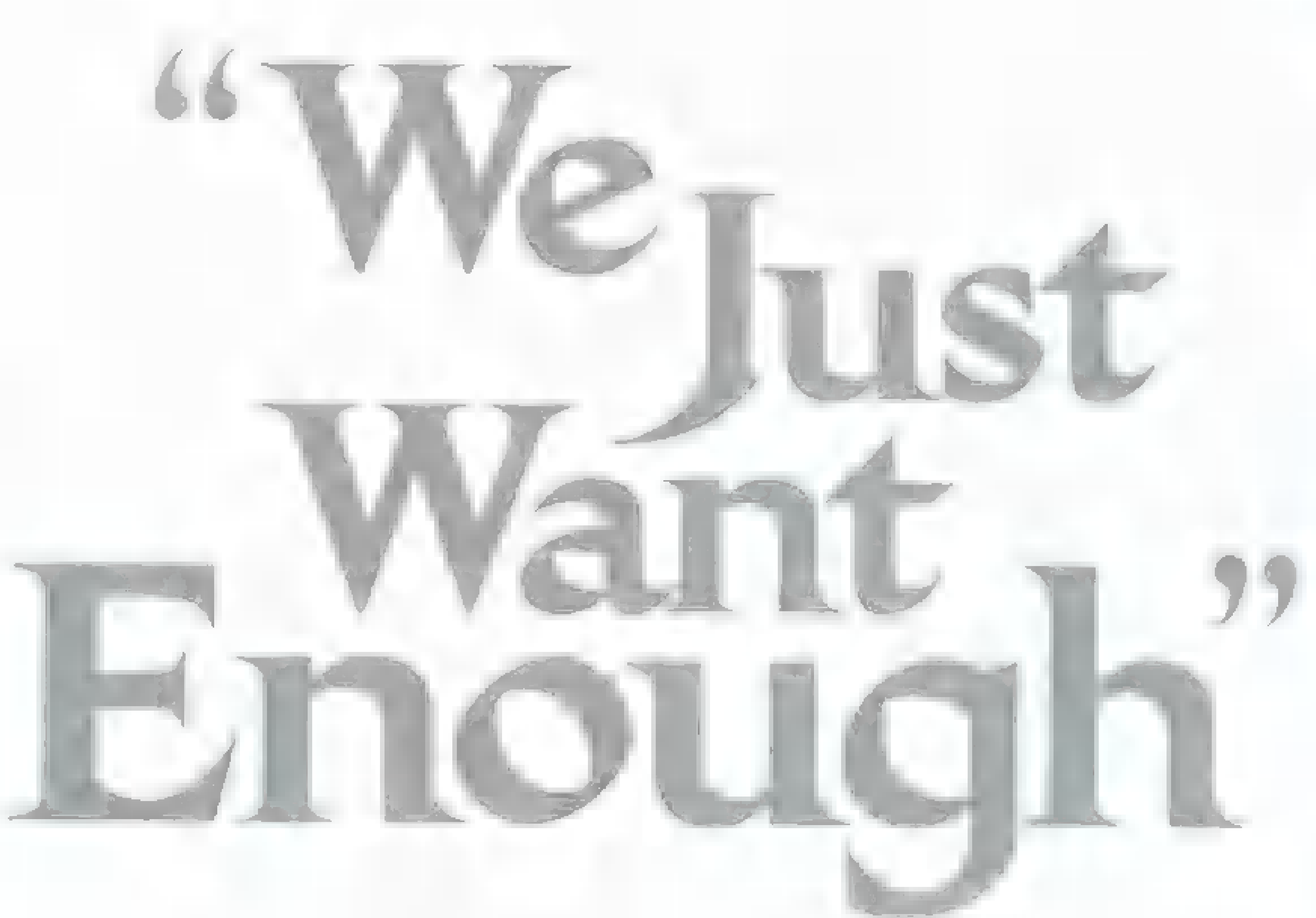
AS CONSERVATIONISTS we've never had a more intense battle to fight. Nor have we ever had more unified and diverse "troops" on the battle lines. The Congolese parks agency has posted undercover agents throughout northeastern Congo, assessing the illicit ivory trade sponsored mainly by remnant militias. Mbuti Pygmies are their "shock forces," tracing the geographic extent of bush-meat hunting by mercenary-merchants. Meanwhile our combined teams of Congolese university students, Mbuti, and villagers are surveying the forest in transects, counting how many elephants and okapis remain in the reserve. (Before the war we estimated 6,000 to 8,000 elephants and 4,000 to 6,000 okapis.)

Our surveyors walking the transects know that the men massacring elephants are some of the same ones who abducted daughters and enticed young sons into impromptu armies. These are the people tearing holes in the forest, killing hope. By documenting their depredations, and publicly decrying them, we are trying to stitch the forest together faster than it can be rent.

And what of the future of the Mbuti, who have no rights to the Ituri forest? If the Okapi Faunal Reserve can be protected, perhaps the holes in the forest caused by war and greed can be filled—and the Pygmies could be secure again. □

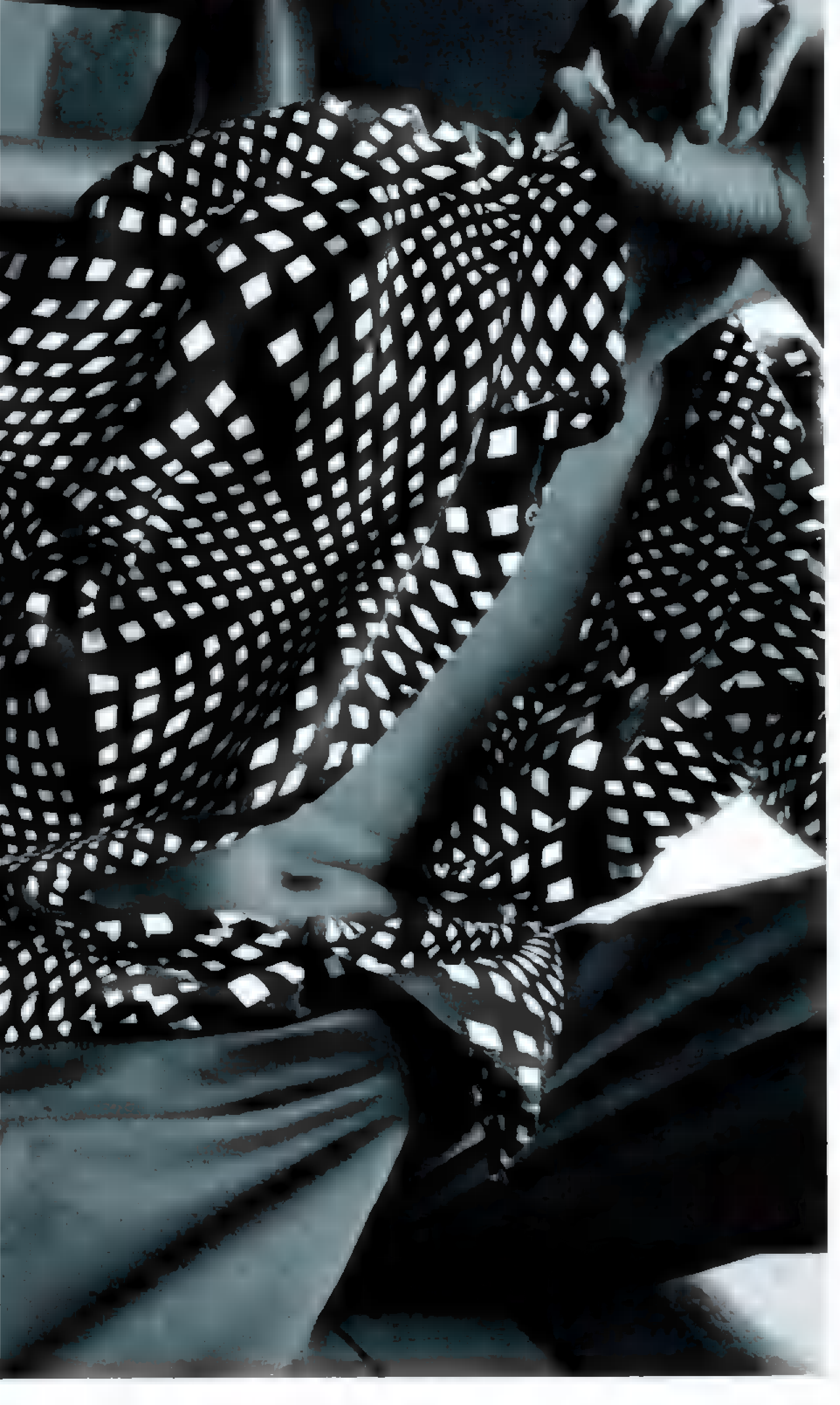
WILD WALLPAPER Decorate your desktop with the magic of an okapi. Then explore Africa across the Internet with a comprehensive list of related websites at **ngm.com/africa.**

FOR ZAMBIANS IN LUANGWA VALLEY—THE VALLEY OF THE ELEPHANTS—SURVIVAL IS A DAILY CHALLENGE, MET WITH SKILL AND COURAGE.

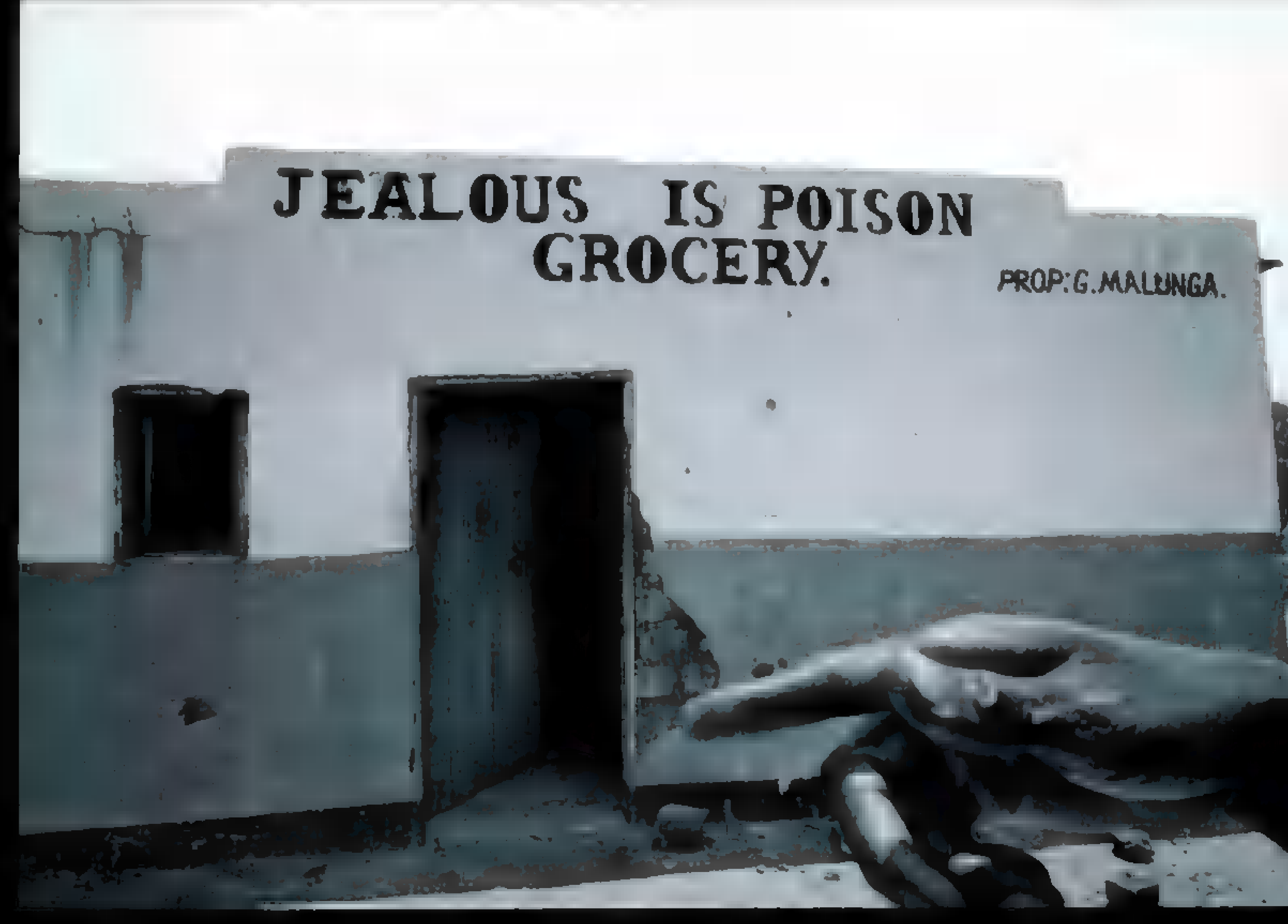


"We Just Want Enough"

At the Salamo village market, workers from nearby Mutinondo Wilderness lodge weigh beans and nuts grown by local farmers. "We're committed to buying what's available in the area," says lodge co-owner Lari Merrett. One hope she shares with many conservationists: As growing tourism supports jobs and builds demand for the crops, crafts, and skills of rural Zambians, wildlife will come to be valued more highly in the wild than in poachers' snares.



Dried on the bone, raffia-tied bundles of illegal bush meat feed a brisk demand in Lusaka. Traders buy the meat from poachers and deliver it directly to regular customers in the capital city. Like shoppers in wealthy countries who pay extra for meat from free-range, organically raised animals, many urban Zambians prefer wild meat—which shows status and respect for tradition—to that of domestic livestock. Penalties for buying and selling poached game are harsh, but enforcement is difficult. Wild meat also enters the food supply legally from game ranches, licensed hunting, harvests on communal lands, and culling of problem animals.



Jealous neighbors may resent the success of a small shop selling soap, salt, and cooking oil (above) despite the painted reminder that such bitterness is toxic. Even modest prosperity is rare in Zambia: Only about 50 percent of adults have jobs, and more than 60 percent of the country's 11.7 million people live on less than a dollar a day. For many villagers, eating illegal wild meat (top left) isn't a luxury—it's their main source of protein. In a recent food-security survey, fewer than a quarter of Zambians said they believed they could reliably feed their families. Widespread malnutrition worsens the impact of diseases like malaria, tuberculosis, and AIDS. Many patients travel hundreds of miles for HIV testing at Our Lady's Hospital in Chilonga (left), where two doctors and 21 nurses treat more than 15,000 people a year. One in six Zambian adults is known to be HIV-positive, and three-fourths have already lost a friend or relative to the AIDS epidemic.

BY ALEXANDRA FULLER | PHOTOGRAPHS BY LYNN JOHNSON

I

The Walk

I had already bought a pair of hiking shoes at the secondhand store in Serenje. Now Rolf Shenton—conservationist, mechanic, popular local politician, and occasional guide—bought me a nylon backpack at the cheap-cheap store. The next morning, in the knifing predawn cold, he drove me to the brink of Zambia's vast undulating plateau, as far as his pickup would go. This is where the edge of the world disappeared in a shawl of mist. Here, written in singing Bemba on the trunk of a large msasa tree, we found the words: "BA POCHA BONSEISENI TWIPAYEIANAMA SHONSE APO TABALALESHA—Poachers come together and kill all the animals here before they stop it."

Rolf introduced me to my new companions: Jonathan Mvula (a Zambia Wildlife Authority, or ZAWA, scout whose name translates like the beginning of a poem: "Jonathan Rain"), Pelete Nsofwa (a village scout whose AK-47 hung off his shoulder like a broken wing), and Sunday Finkansa (a toughened former poacher).

I followed them, hurrying in a half trot to keep up—which seems an apt metaphor for trying, as I was, to get a grip on the relationship that Zambians have with their wildlife. This was a single idea with a hydra head. A man's idea of an elephant, for example, is bound to change depending on whether he experiences the animal at the end of a telephoto lens, the end of his millet plot, or as a weekly stew. Walking into the Luangwa Valley with men who knew game from opposite ends of the law seemed as good a place as any for me to begin.

Roughly 450 miles long and 60 miles across at its broadest point, Luangwa is the tail end of Africa's Great Rift Valley, rich in wildlife and scenically remarkable. The place feels more mysterious and remote than it really is, in part because it is difficult to navigate by vehicle in the dry season and virtually impassable by any means in the rains. Four national parks—North Luangwa, South Luangwa, Lukusuzi, and Luambe—and several game management areas (GMAs) exist in the valley and its immediate surrounds. (GMAs are buffer zones between the parks and the rest of Zambia; here hunting, habitation, and farming are permitted.)

Just before we dropped off the edge of the escarpment to begin our descent into the valley, I turned back for one last look at the plateau that has an umbilical pull for me, being the place where I spent the happiest years of my childhood. I could hear the disappearing whine of Rolf's pickup engine. Then the silence was such that I couldn't tell if the buzzing noise in my head was the ubiquitous hum of insects or the bees in my head left over from my last dose of malaria.

Sunday Finkansa Was a Born Poacher

Sunday led our party down the escarpment into the valley, and he walked without watching his feet because he has hunted (illegally) every inch of this basin, and he knows it the way the rest of us know our way to the bathroom at night. He is 44 years old, with a face like granite—as if you might reach below it and find some direct connection to the earth—and a short, square body hardened by deadly exercise. He is deaf in his right ear from where a game scout kicked him in the head ten years ago, but he has made up for his impaired hearing by employing at least one other sense that the rest of us don't even know we have.

We stopped for lunch, and I asked him questions, with Jonathan's and Pelete's help since they speak several languages well, including Bemba (which is Sunday's mother tongue) and English (which is my only tongue).

Sunday was recruited into the poaching business in 1981 by his uncle, a Mr. Saili of Salamo village, he said, as if I should know who that was. So I nodded, pretending. Sunday isn't sure, exactly, how many animals he killed during his

20-year-long career as poacher. "Thousands and thousands," he conceded at last, which may have been a translation glitch, but I wouldn't count on it.

In 1982 Sunday, who was along to help his brother hunt, was arrested for killing a rhino. "The scouts found us," he explained. "My brother absconded. Me? I was left in the sun." Sunday stayed in Mpika jail for three years. "Three years hard labor. Three years sleeping one man on top of another. Three years no fun. To start, they tell you, 'Greet the house!' You have to fall on the ground and roll in the dust and call them with respectful names. After three days of beating and starving, they ask me why I am in jail, and I tell them, I am a poacher. Then they say, 'good *milile*' [good food] and after that they call me Bwana, and they treat me with respect because I am a strong man who does not fear the government. But it is not an easy life."

"Did you stop poaching then?" I asked.

"No. Poaching is something like a family disease with me."

When Sunday killed another rhino in 1986 and sold the horns in Ndola to a man from Senegal for the equivalent of $800, the cash was split among the family members with whom he hunted. Sunday used his share to buy a few goats, some pigs, a bicycle, and a pair of gum boots. With what was left, he got very drunk for a fortnight.

No Man Should Have to Bury His Son

Four years ago Sunday was persuaded by his conservation-minded chief—Chief Mpumba—to give up illegal hunting, but his sons stayed in the business. Then the elder son was killed by scouts. "They shot him to death in the south park," Sunday said. "My other son was fortunate. He was merely shot in the leg. He walked for three days to find me. He told me, 'Charles is dead.' So I came back into the park to the place where they killed my son. Just a few bones scattered here and there. That was all that remained."

When Sunday had finished telling us about his son, no one spoke or moved for a while because there didn't seem to be anything to say or do about a strong man's dead child. Then Jonathan stood up with a sigh and began to pack away his books (he was teaching himself the Latin names of the valley's flora and fauna). "Come on white person," he said to me, "try walking. So far you have said 15 words for every one step. Walk like a Zambian."

Scorpions and Camping

That evening, after supper, the village scout, Pelete Nsofwa, was stung on the hand twice by a scorpion. The pain of such a sting is enough to make a grown man scream for two days, but Pelete just squeaked a bit and accepted my offer of aspirin. Sunday wanted aspirin too.

"Are you in pain?" I asked.

"No," Sunday said, swallowing the pills.

Then we spread a tarpaulin on the dust to help prevent further scorpion incidents and lay around the fire, smoking and talking under a deep purple-black sky. Jonathan told us that early last season, in long grass, his youngest brother, leading a scout patrol, walked into a black mamba. It says something of the strength of Jonathan's brother that it took him three hours to die from the resulting bite on his face. (I heard once, at a snake farm in Mombasa, that in Kenya a black mamba is known as the two-step snake—the supposed number of steps a bitten person can expect to take before dying.)

"You have seen? There are casualties in this game," Jonathan said lighting a cigarette with the end of a burning log. "Pa-pa-pa," he said softly, blowing smoke into the fire. "Has your heart ever done like that?" he asked me, "pa-pa-pa-pa."

"Yes," I said, meaning it.

That night my dreams were noisier than the reality of the winter-shocked night, and the next morning I awoke early to find that the cold damp of the nearby wetland had insinuated itself over our camp. In the cathedral quiet of that miombo woodland, the crackle of dew-drying grass was interrupted only by a call of a ground hornbill (like a stone dropping into a deep well) and the clear, diminishing tone of a single Jacobin cuckoo. I was not, but felt as if I could be, in the heart of an unpeopled world. We were only two days' walk from the noisy civilization of Mpika town on the valley's western edge (the Fuka Fuka Night Club, the Discipline Restaurant) and two or three days' walk from Mfuwe town on Luangwa's eastern edge ("MAY GOD RECEIVE MY BROTHER, REST IN PEACE," reads the sign above the bar in Friday's Nite Club,

WHEN ELEPHANTS KILL

James Beza mourns the death of his sister. Ida Beza had gone into the bush to gather medicinal plants and was trampled to death by an elephant. In this small room she had served her neighbors as a traditional healer, treating children suffering from malaria and married couples struggling with infertility. Perhaps 12,000 elephants now live in the Luangwa Valley (roughly the size of Switzerland), and as their numbers have increased, so have conflicts with people. These powerful animals ravage crops, raid food stores, destroy fences, damage homes, and worse: Conservationists report that last year alone, elephants and other wild animals killed 18 people in the valley.

where a room costs three dollars a night and a "rub" with one of the local ladies-of-comfort costs one dollar and/or your life).

Tugging free of my sleeping bag, I noticed that Jonathan was already up and enjoying a cigarette with the self-contained attitude of a habitual early riser.

"*Kwazizira*—It's cold," I whispered to him.

Jonathan patted the log next to him, so I stepped carefully over the three embalmed bodies of our companions and made my way to the fire. We sat together, hands stretched out toward the heat, his blanket thrown over both our shoulders, and waited for water to boil for tea. The smell between us was familiar: fresh tobacco, old sweat, smoke, yesterday's dust, the synthetic, cheap-shop smell of his blanket.

Blindfolded, I would have known where I was.

The Cost of Walking for Days Through the Middle of Nowhere

The women at the Chifungwe scout camp, seeing me emerge from the bush, sent a child in search of a mirror. Like characters in an 18th-century novel, they deemed it prudent to show me the full horror of myself. Then they fetched me a bucket of hot water, tea, and a comb.

Rolf met me here, having driven down off the escarpment on axle-breaking roads. That night I fell asleep listening to the village breathing. In the morning there was the domestic chatter of women to wake me, as they walked down to the river to fetch water. There was such an explosion of birds I couldn't untangle their song. It was the mopani-leaf turpentine that I smelled and wood smoke and game droppings and the pungent swirl of the river. And the world rocked with life.

On this page I can't smell the burnt-honey scent of bee sting, or feel the smallness of who I *really* am under the ponderous annoyance of an elephant, or understand that animals share my fright—a leopard is chased by an angry baboon troop. But I have understood that I am only the sum of my biology. And what this grants me is the undeserved gift of connection, usually granted men and women of transcendent and disciplined lives.

Long Words on a Hot Afternoon

I do penance by pretending to read the exhaustive *A History of Wildlife Conservation and Management in the Mid-Luangwa Valley, Zambia,* by W. L. Astle, published by the British Empire and Commonwealth Museum, Bristol, August 1999. From the preface: "It is an account of recorded events . . . from the start of European penetration at the end of the 18th century to the early 1970s, the time of the start of a ferocious onslaught by commercial poachers."

The Story That Got Away

Not everything went exactly as written on our itinerary. For example, here we were, stranded on the banks of the Lukusashi River. The water was riotously deep, and the pontoon looked too rickety to support much more than an overladen bicycle. Walking down the beach while we got used to our only option, which was to turn back the way we had come, we found three Indians in torpid sleep across the seats of their car. They knew Rolf (of course) and tried to be helpful: "You'll never get over that river now. Camp with us a couple of days and then try your luck."

The young one (a Rambo look-alike) said that game scouts killed a man-eating crocodile here a few days earlier. Its stomach revealed clothes and human remains.

"It's too bad you weren't here then," said Rambo's uncle. "It would have made a nice story for your magazine."

The Life You Save Might Be Your Own

It was nearly dark by the time we left the Indians and emerged, beaten by heat and dust, at the paved road. We begged a bed at St. Luke's Mission Hospital in nearby Mpanshya, and in the morning a beatific Polish missionary brought us boiled eggs and tea and toast on her way back from early morning Mass. She told us one of her patients had died in the night. While we ate breakfast, she listened to Rolf's lungs (in the metallic chill of the Southern Hemisphere's winter nights, he'd come down with pneumonia) and told him to quit smoking. Then she showed us around her AIDS ward, humid with the sour-sweet smell that is the end of life. Eyes followed her every move as she touched blistered skin, stroked heads, held hands, moistened lips.

I thought that if my body were eating itself alive, I'd want Margaret Strzelecka by my bedside. She's afraid of nothing, not even death, but would prefer that mating geckos didn't fall on her in the middle of the night.

The Cure

Just this side of Serenje, Rolf introduced me to a doctor who sells traditional cures. "FOR HIV/AIDS," said a chalky sign in front of a pile of hairy, round tubers—African potatoes. "AND TWO POWERFULL ROOTS," read another sign, selling the dusty, nondescript clumps of bark that look like dried sugarcane and are supposed to act as a tonic for every other ailment. The healer was impressively sloshed for so early in the day, clinging unstably to a different orbit of the Earth than the rest of us. He borrowed Rolf's penknife to slice a tuber open (a bleeding orange color, its flesh harder than a yam's), slashing a deep cut in his hand in the process. He wore a stained white medical coat over a Mickey Mouse sweatshirt and dusty leather penny loafers. A smiley-face badge on his coat said, "I KNOW ABOUT HIV/AIDS. DO YOU?"

"The problem with my medicine," said the healer (pasty balls of white had gathered at the corner of his mouth), "is this: People get cured, and they feel better, and they go off and get reinfected, and they die. Then they say, 'No, your treatment does not work.' But it works." The healer offered us the white powder to taste, "Two powerful roots," he said. The taste reminded me of quinine.

"Wonder what it does for pneumonia?" said Rolf, taking a lick. Then he asked the healer for a cure to stop smoking.

"Ah, that's just too difficult," said the doctor. "Try eating boiled sweets."

The Chief Who Became a Conservationist

Most Zambians begin conserving from the moment they wake up in the morning: water, food, fuel. Most Zambians only waste what feels abundant, which is why the entire country seems to go up in smoke every July or August. Fires are set by accident, by poachers, by children trying to catch rats, or by honey hunters smoking out bees. But the extent of the waste is only apparent to those of us who can see the dry-season burn from the perspective of an airplane. If, on the other hand, you stand on an anthill almost anywhere in rural Zambia, it feels as if the trees and grass and land must go on forever, at least as far as it would be possible to walk in a day or two.

With dignified protocol, Rolf deferred casually at the chief's feet. I knew I was supposed to submit in a similar way but when the time came, I remained stubbornly transfixed, knees locked. The chief, being well-bred and scrupulously brought up, pretended not to notice.

Chief Mpumba's area spreads around the central western edge of the Luangwa Valley, the rolling end of treed meadows which, although empty of wildlife now, ached with the memory and hope of animals. Chief Mpumba has set aside 74,000 acres of his 3,276-square-mile territory as a wildlife conservatory and has started a society for conservation-minded villagers, many of whom, like his subject Sunday Finkansa, are former poachers. We drank sweet tea and ate fresh buns on the palace veranda and dreamed wildlife onto the landscape. Some women swayed into the chief's yard from the village to collect water. A few chickens took a dust bath. The sun swelled to a hundred times its normal size and ate everything on the horizon.

It was Rolf who afterward pointed out the chief's generosity. We had been treated to our own tea bags, a new one for each fresh cup of hot water. I might otherwise have forgotten that I had accepted three cups of tea, while the chief will probably never forget.

Sunday's Uncle

Rolf left me at the house of Sunday Finkansa's uncle, a former godfather of poaching, Mr. Saili of Salamo village: a 73-year-old man with a fake-Rolex swagger and the remains of his illegally acquired wealth—a truck—rotting on wooden blocks behind his house. He is now an active member of Chief Mpumba's conservation society, but there is something of the faded-glory, bad-old-days in his eyes as well as the weariness of tragedy. Five of his twelve children have died. He and his wife take care of eight orphans. He agreed to walk with me up the road where he said someone would have bush meat to show me. "All these people here know who I am," he told me, "and so if they are poachers they run from me. They know I no longer act in an illegal way."

Near a tin kiosk selling matches, condoms, and soap, a haunch of kudu was produced for my benefit. Then a scuffle broke out. "You are stupid!" yelled a man, shaking his fists at us.

The Politics of Poaching

In 1970 the Luangwa Valley contained one of Africa's greatest concentrations of elephants and rhinos. Best estimates *(Continued on page 118)*

Frontline troops in the battle against poachers, Zambia Wildlife Authority recruits (above) practice their shooting skills in North Luangwa National Park. Despite limited resources, they're claiming victories. By the mid-1980s global demand for elephant ivory and rhino horn had fueled a poaching explosion in the Luangwa Valley that killed 75,000 elephants and effectively wiped out black rhinos. But the tide is turning: Elephant numbers are on the rise, and last year five black rhinos were reintroduced to North Luangwa National Park from South Africa. At Chilyaba Community School, students pack a classroom to see pictures of the rhinos (the oldest, Kanabesa, appears on screen), brought by Elsabe van der Westhuizen of the North Luangwa Conservation Programme and her young daughter, Marileen (left). Such school experiences sparked Kennedy Nkoma's conservation interests. Now a guide for the Wildlife and Environmental Conservation Society of Zambia's Wildlife Camp, Nkoma (top left, at center) leads guests through South Luangwa National Park.

ALL IN A DAY'S WORK

Running a business in the bush requires making the most of every resource. At Shiwa Ng'andu game ranch, senior scouts Tresford Mulindwa and Pierre Chibesa, at center and right, will prepare the meat from this sitatunga carcass for sale at a nearby market. Head, hooves, and hide will go to the licensed hunters who paid $6,000 to take the old male antelope from the ranch's growing population. Occasional hunting fees supplement income from photographic safaris, overnight guests at 80-year-old Shiwa House, background, and sales of cattle, sheep, and wild game. Inside the ranch's 70 miles of fence, 22 large mammal species and some 375 species of birds are flourishing.

A leopard's leg bone, deformed by embedded wire from a poacher's snare, draws somber looks from high school students (above) visiting the Chipembele Wildlife Education Centre. Co-founder Anna Tolan teaches at the center and raises money to help 136 local children get an education. Twelfth-grader Chanda Mshota, at center, is one of them. They're "desperate to learn," Anna says, "and we can give them hope." Supported by the North Luangwa Wildlife Conservation and Community Development Programme, traditional birth attendant Joyce Chuba (top right) uses a clay stethoscope she fashioned herself to examine Josephine Malama. A baby girl, named Ngosa, arrived in December—one of 400 safe births Joyce has attended since 1995. Program coordinator Hammer Simwinga (right) teaches village women how to establish a group savings fund. Micro-loans from such informal "banks" offer capital that helps build small businesses and support rural families.

(Continued from page 111) back then put elephant populations at 90,000 and rhino numbers at 8,000. By the mid-1980s elephants in the entire valley had been poached down to fewer than 15,000, and nothing but rumors remained of the rhinos. A thousand elephants a year were being slaughtered in the north park alone. The landscape was strewn with dead elephants. Camps with massive meat-drying racks supported scores of poachers (many of whom were sponsored by corrupt members of the then Zambian government). The surrounding villagers, some no more than ten-year-old children, were paid as little as a pound or two of meat for their services as porters for weeks of grueling work.

By the time Mark and Delia Owens came to the area (attracted by its remoteness) to study lions, North Luangwa National Park was more a war zone than a refuge for wildlife. Realizing that the only way to regain the park was to regain the people who could be its stewards, the Owenses encouraged Chief Mukungule and his people to exchange poaching and porter work for small-scale industries (for which the Owenses provided financial support and technical training). Then, in 1990, the Convention on International Trade in Endangered Species put into effect a moratorium on trade in ivory. Elephant numbers slowly began to recover, to such an extent that now the animals are spilling across the park's boundaries, and the villagers of Mukungule beat gongs and plant fences of chili peppers in an effort to keep the beasts from sailing like battleships through their crops at night.

The Owenses left Zambia in 1996, but the Frankfurt Zoological Society—their former funding partner—has continued conservation efforts in North Luangwa National Park and its adjoining communal lands. Hammer Simwinga, a protégé of the Owenses, is running the village projects. The combined success of their work has resulted in the continued protection of elephants and the transfer to the park of five black rhinos from South Africa.

But the rescue of the north park and the autonomy of the people who live at its periphery were not universally celebrated in Zambia. Displaced poachers, corrupt officials, and a few territorial local tour operators all felt, for different reasons, that the protection of the park had gone too far. Zambia has one of the most sluggish economies in Africa, so wildlife revenue —whether from illegal ivory or legal hunting and tourism—is a fiercely protected commodity and one that local entrepreneurs are loath to share with foreigners.

So mention the Owenses' names in certain circles in Zambia, and you will be likely to hear the rumors that have grown up around them, fueled by a misunderstanding of their work, by a provincial mistrust of foreigners, and by a barely concealed envy of their well-funded projects. Unable to substantiate a single rumor (which range from untrue stories about their antipoaching operations to wildly inaccurate accounts of their personal lives), I interviewed the one person uniquely poised to speak favorably, or not, of the Owenses' work.

Chief Mukungule—spokesman for the people of Mukungule—is not hard to find. He's at the same place where the Owenses last saw his predecessor in 1996. The day I met him, he was dignified in a fedora and a neat pin-striped suit (fading black to licorice-green). His face was etched with the kind of wisdom that comes at a price. He spoke briefly, almost wearily, as if conserving energy for the long dry season ahead. "It's better now days," he said simply. "Those days of poaching are gone." When I mentioned the Owenses, he stiffened. "You cannot," he said firmly, "separate Mark from this place. You cannot imagine what this would be without Mark and Delia. They did a job well done."

Jealous Is Poison

When I saw the store sign—"JEALOUS IS POISON GROCERY"—I took its photograph. It seemed to prove in a concrete way the intangible quality of jealousy, which pervades all spheres of Zambian society, and is a trait—sometimes the only one—sincerely integrated by expatriates.

Rachel

At a safari camp on a hot afternoon, with the gilded reflection of the Luangwa River shining on our faces, I interviewed Rachel McRobb, who is the head of the South Luangwa Conservation Society. She is an engaging, energetic woman in her early thirties with sun-tough skin and a rope of thick blond hair down her back. She seems both practical (she can track and dart a wounded elephant) and passionate (this opportunity

is, she told me, her dream come true). Her hands are the product of manual labor. She tells me that elephant poaching has not ended in the Luangwa Valley (over 30 elephants killed in 2004 that she knows of). Two bulls were killed close to safari camps recently—a depressing development, indicating a resurgence in ivory harvesting in the valley. She runs her antipoaching operation with 17 scouts, two vehicles, a boat, and sheer determination.

I am inspired to interrupt her. "Do you need another scout?" I say, "because if you do, I know someone who knows this valley like we know our way to the bathroom at night."

Lusaka and Bush Meat

This city has a jumpy, addicted feel to it. The hotel garden shrieked with bird life, and there were crocodiles in the courtyard pond; the fountains on either end of Cairo Road blustered with fresh water, and the street children were mad-eyed (those who can afford it sniff glue or gasoline, and those who can't sniff *jenkem*, fermented human sewage kept in a plastic bag for a week or so until it gives off intoxicating fumes).

I phoned Fred (not his real name, given the illegal nature of some of his culinary exploits) —an old acquaintance gifted with street smarts —and hired him to translate Lusaka for me in the context of *nyama*, a word that describes both wildlife and the meat butchered from it. I should have known that elephant stew and an afternoon at Munda Wanga Wildlife Park in Chilanga would be about the extent of Fred's wildlife experience.

"It's cheap, it tastes better, and you can keep it without a fridge," he said. Fred is striking in a muscular, smooth-skinned way, like someone you'd see on the cover of a self-help book. He and half the people he knows eat the smoked bush meat up to four times a week. "It can even give you," he flicked his eyebrows at me unequivocally, "power."

I had no reason to doubt him.

"Especially," he added, "buffalo and elephant."

I told him that anyone found with illegally taken wildlife products could be locked up for five years, which, given the condition of Zambia's prisons, might feel like—or actually *be*—the rest of your life. Fred laughed. "Of course, but it is just normal for us to eat bush meat," he said. Then he told me that nowadays the meat is sold door-to-door to trusted customers from a suitcase, sotto voce. Ivory is sold similarly.

We were having this discussion, skittering along on the outskirts of the city in Fred's red mouse of a car. I looked out the window. Zambia's thriving street economy was in full buzz: a traditional healer selling garish potions in greasy bottles, charcoal traders lounging against their sacks, stone crushers setting up with their pyramids of white gravel.

"Look," Fred finally said, "things are tough for us. We take work where we can find it. What is the alternative?"

Sunday Finkansa, Again

Because I am writing about Africa, but sitting at my desk with a view of snow-clad mountains in Wyoming, I have put my country around me. A map of the Republic of Zambia blocks my immediate impression of the Northern Hemisphere, and then, above that, there's a photograph of the "JEALOUS IS POISON GROCERY," a picture of the tipsy traditional doctor, with his smiley-face badge, and an informal portrait of me with the former poachers and scouts taken the day after we had reached the Chifungwe camp. I have dogs at my feet and a pot of African tea stewing on my desk.

One morning this message pops up in my e-mail: "We are battling along as usual," Rachel McRobb writes. (It has been months since I spoke to her. There is already a threat of snow in the air here, while Zambia is drooping in steamy heat.) She says, "But the guys have been fantastic. We employed Sunday Finkansa and two others from Mpika, and they arrested someone on their first patrol."

I yell excitedly, frightening the dogs, who think it's their fault.

I look up above my computer to the photograph I have there of us. In the photograph my arm is over Sunday's shoulders, and he is tipping his face suspiciously into the camera, with his housecoat half buttoned over gum boots. He looks belonging to that earth, sure of himself. "Walk like a Zambian, you old scoundrel," I tell him, knowing that he will.

EXPLORE THE MARGIN between life and death in a multimedia feature narrated by photographer Lynn Johnson. Read author and photographer field notes and join our forum on the politics of poaching at ngm.com/africa.

"They are all my friends," Mariate Banda, standing at center, says of the laughing women who fill the Cinderella beauty shop in Mfuwe. Visitors to South Luangwa National Park flock through town, but few venture into this shop, which lacks the modern hair dryers travelers expect. Her small salary makes saving difficult, but Mariate has a goal: "My life's ambition is to have my own equipment," she says—even a dryer for tourists. Despite poverty, disease, and daunting conservation challenges, Zambians share Mariate's gently indomitable optimism. They believe they can lift up their struggling nation and make their children's lives better than their own.

WHAT DOES THE FUTURE HOLD FOR THE CONTINENT'S MAGNIFICENT ANIMALS?

A gelada monkey in Ethiopia's Simen Mountains reflects Africa's menagerie of wildlife born to uncertain times. Safe for now with the end of the Ethiopian war, geladas—completely dependent on alpine grasses—face the long-term threats of encroaching farmland and climate change.

NATIONAL GEOGRAPHIC PHOTOGRAPHER MICHAEL NICHOLS

AN AGE-OLD RACE *between lioness and kudu in Etosha National Park, Namibia, is no sure bet for the big cat—nor is her long-term survival. Fewer than 900 lions live in these arid lands, where scarce resources force competition between humans and wild animals, and farmers shoot those that prey on livestock.*

HERDS CONVERGE *each spring during the great Serengeti migration, when 1.5 million wildebeests, zebras, and gazelles roam for hundreds of miles across Tanzania's unbroken plains, seeking rain-fed forage and water from the Serengeti River. "If we can maintain their habitat and protect the water supply," says zoologist Tony Sinclair, "these herds should be safe for posterity."*

MITSUAKI IWAGO, MINDEN PICTURES

BY DAVID QUAMMEN

S

SO: AFRICA IS COMPLICATED.

The continent's most pressing concerns, yes, are political and economic and medical. Landscape itself is often a battleground here, not just for armies but for opposing visions of resource exploitation, conservation, and governance. Africa is fraught with issues that demand careful study, cool discussion, hard choices, compromise, meticulous attention to boring details, and patient planning; that call upon a range of human skills, including diplomacy and sociology. But beyond all the complexities, at the end of the day, at the start of our new millennium, there's one salient fact: Africa is an extraordinary repository of wildlife. It's the greatest of places for great beasts.

This fact, which seems so simple that people take it for granted, is actually a bit complicated itself. The roster of species, for starters, is dizzyingly diverse: three big cats (lion, leopard, cheetah), seven smaller cats (such as the caracal and the serval), two species of elephants (African and forest), two rhinos (black and white), two hippos (pygmy and regular), two giraffes (the tall one and the okapi), three species of nonhuman ape (gorilla, chimp, bonobo), three zebras, nine gazelle species, nineteen duikers, dozens of monkeys, five species of baboon, a gaggle of genets and civets, six different pigs, four pangolins, three reedbucks, some horsey antelopes, some dwarf antelopes, nine species of spiral-horned bovine (including the bongo, the sitatunga, and the eland), two wildebeests (that's gnus to you?), the aardvark, the aardwolf, the drill and the mandrill, the rhebok, the blesbok, the gemsbok, the wopbopaloobop (no, only kidding), the African buffalo, the Nubian ibex, three hyenas, three jackals, the Ethiopian wolf, the wild dog, and many other mammals, not to mention the ostrich, three species of crocodile, the African python, plus sharks and other sizable fish in the coastal waters, as well as smaller terrestrial animals of every imaginable sort. Wow. It's a spectacular assemblage, both in variety and in abundance, unmatched elsewhere in the contemporary world. But to appreciate fully what's present in Africa, you need to consider what's absent elsewhere, and why.

That's the task of paleontologists, who study wildlife and vegetation of the past. Their data come from the fossil record, and their vast backward calendar of Earth's history is demarcated by episodes of mass extinction. Each such episode represents an abrupt loss of biological diversity and marks a boundary between two (otherwise arbitrary) units of time. By the end of the Cretaceous period, for instance, 65 million years ago, there were no more surviving dinosaurs—not by coincidence, but because the disappearance of the dinosaurs is one of several important factors *defining* the end of the Cretaceous. At the close of the Permian period, 245 million years ago, came another massive die-off, cataclysmic and sudden, eliminating about 95 percent of all animal species in existence then. The Pleistocene epoch, a more recent unit that ended just 10,000 years ago, is also known for its extinctions, especially among big mammals and huge, flightless birds. The mammoths and mastodons vanished, along with giant sloths, giant bears, giant beavers, saber-toothed cats, giant kangaroos, and countless other large-bodied animals. Many of those Pleistocene extinctions occurred near the end of the epoch, most notably in North America, South America, Australia, New Zealand, and Madagascar. What caused them? Nobody knows. Lethal changes of some sort, still mysterious, still debated by experts, affected those particular continents and islands. Probably the arrival of humans was at least part of the problem. We appeared from nowhere, armed and dangerous and hungry.

Africa was different. Africa suffered only modest losses of fauna during the Pleistocene (which

began about 1.8 million years ago) and no widespread, severe, or simultaneous set of extinctions at its close. Mostly the large African mammals of 20,000 years ago have survived as the large African mammals of today. For that reason, Africa has been called the "living Pleistocene." It stands to remind us of an epoch, before the rise of *Homo sapiens*, when the planet was *really* big and wild.

But remember another thing: The survival of Africa's wildlife hasn't depended on an absence of people. It has happened, to the contrary, amid constant human presence. We ourselves are an African species, at least by origin. We first emerged in this place, attaining our current shape, our brain size, our social instincts, and our sense of identity during millennia spent as members of rough-and-tumble African ecosystems. The animals adjusted to our presence—to our slowly but radically increasing capabilities—even as we adapted to life among them. One lesson along the route to civilization, learned accidentally by African peoples, and evidently not portable when humans dispersed elsewhere, was the possibility and rightness of coexisting with other formidable species, even those sometimes as menacing as ourselves.

That was a virtue derived from necessity. And now the necessity is gone. Killing wildlife, extinguishing species, and destroying habitat are easy with our current weapons and tools. Preserving the last of the great beasts in their landscapes, despite human needs and pressures roundabout, is more difficult. But wait, here's a thought, unabashedly hopeful and as wild as an aardvark: Maybe modern Africa is where we can rediscover how it's done.

THEO ALLOFS, CORBIS

Cool mud tempers a stifling day in Botswana's Chobe National Park. With soldiers enforcing antipoaching laws, elephant numbers in Botswana have topped 120,000—an all-too-rare success for African wildlife. Some officials urge elephant culling to reduce vegetation damage and hazardous encounters with humans, but biologists say parks can support the growing herds.

SHARKS' FEAST *Off the east coast of South Africa, where million-thick sardine shoals make their phenomenal northern migration of more than 600 miles. Stricter fishing regulations in recent [illegible] have boosted sardine numbers, a [illegible] to [illegible] sharks—themselves a target [illegible] commercial fishing—and [illegible] the country's once ailing sardine industry. Fishermen today [illegible] 220,000 tons a year.*

▶ Download [illegible] wallpaper at ngm.com/africa

TONY HEALD, NATURE PICTURE LIBRARY

WILDCAM BRINGS YOU WILD ANIMALS LIVE.
The "living Pleistocene" is as close as your computer screen. From mid-August through early November see elephants, lions, leopards, giraffes, ostriches, cheetahs, zebras, wildebeests, impalas, elands, hyenas, baboons, springbok, jackals, and more at an African watering hole called Pete's Pond. Discover the magic of Africa 24 hours a day at **ngm.com/wildcamafrica.**

CHRIS JOHNS, NGS

A SUBMERGED HIPPOPOTAMUS *in South Africa's Kruger National Park is one of perhaps 2,500 in Kruger—a stronghold for a species once ubiquitous in Africa's rivers and lakes. Vulnerable to drought and easy targets for hunters, hippos face declines in many spots, while going strong in others. In deeper trouble, the wild dog has been hit by rabies and distemper, slaughtered by cattle farmers, and pushed onto marginal lands by competitors. With a need for large home ranges, the dogs are hard to protect: Fewer than 5,000 remain in Africa.*

LEOPARDS SCRAP *over territory on private land outside Kruger National Park. Thousands of South African cattle farmers are now converting acreage to game farms, giving leopards added prey—and added value as an ecotourist draw. Populations appear healthy, but accurate counts are lacking, and land fragmentation and increases in trophy-hunting quotas (now around 2,500 a year) could erode leopard numbers.*

NATIONAL GEOGRAPHIC PHOTOGRAPHER MICHAEL NICHOLS

RICHARD DU TOIT

MATING RIVALS, *zebra stallions battle in Botswana's Moremi Reserve, where permanent water holes keep them hydrated through the dry season. Plains zebras are still abundant in southeastern Africa, adaptable as long as water is plentiful. Nearly obliterated by the ivory trade, forest elephants (opposite, in Central African Republic) made a partial recovery after a 1989 ivory ban. Today the species faces habitat loss from logging and a rise in poaching as ivory's market value creeps back up. "The prognosis isn't good," says conservationist Mike Fay.*

RARE MOUNTAIN GORILLAS [illegible] *Rwanda's Virunga region have brought pride and tourist dollars to the warworn nation. During civil unrest and genocide, refugee movements and lax government enforcement of wildlife protections left gorillas [illegible] Their numbers have risen [illegible] 380 (from [illegible] in the early 1980s[illegible] But "even [illegible] [illegible]cted," [illegible] conservation sc[illegible] [illegible]dder, "sma[illegible] populatio[illegible] [illegible]re extremely fragile.[illegible]*

GE[illegible] PICTURES

ONCE REDUCED *by poaching, giraffes now appear to be holding their own in the Serengeti—one of the [illegible] places on Earth where wild animals, uninterrupted, still run their ancient course.* ▢

MITSUAKI IWAGO, MINDEN PICTURES

Get Involved

AFRICA

Make a Difference

You don't have to go to Africa to help in Africa. These organizations are among those respected for their effective work on the continent.

Africare *africare.org*
202-462-3614
Africare works only in Africa on projects including emergency aid and community development.

CARE *care.org*
1-800-521-2273
With more than 300 projects now under way in Africa, CARE provides food, shelter, education, and safety to those in need.

The Carter Center
cartercenter.org
1-800-550-3560
Former President Jimmy Carter and his wife, Rosalynn, founded this organization in 1982. Its work in Africa includes activities from repatriation of refugees to eradication of infectious disease.

Refugee families in Sudan receive help from Doctors Without Borders.

Doctors Without Borders (Médecins Sans Frontières)
doctorswithout borders.org
1-888-392-0392
Health professionals volunteer to provide services and essential medications.

Global Rights
globalrights.org
202-822-4600
Staff members work with African lawyers and activists to advocate for human rights.

Human Rights Watch
hrw.org
212-290-4700
This group investigates reports of human rights abuse and lobbies for change.

International Rescue Committee
www.theirc.org
1-877-733-8433
Founded in 1933 to aid victims of Hitler's regime, the IRC now helps Africa's refugees through on-site relief, legal advocacy, and resettlement.

UN World Food Programme
wfp.org
202-530-1694
Each year the UNWFP feeds an average of 90 million people in more than 80 countries. Its current work in Africa includes maintaining a major presence in Darfur, Sudan.

MAJOR HUMANITARIAN ORGANIZATIONS AT WORK IN AFRICA
2003 Expenditures

World
Africa

Africare
International Rescue Committee
Oxfam International*
Doctors Without Borders
CARE*
International Committee of the Red Cross*
Feed the Children
UN High Commissioner for Refugees
UNICEF*
World Vision International
UN World Food Programme*

0 500 1,000 1,500 2,000 2,500 3,000
Millions of dollars

* Data for sub-Saharan Africa only

KEEPING UP WITH AFRICA

These sites can help you get the latest news on Africa.

- **AllAfrica** is the world's largest electronic distributor of African news and information. Go to *allafrica.com*.
- **BBC News Africa** offers comprehensive coverage of subjects including business, politics, culture, and sports. Go to *news.bbc.co.uk*.

MARCO LONGARI, AFP/GETTY IMAGES; GRAPH: NG MAPS

VYTORIN treats the 2 sources of cholesterol.

You probably know that cholesterol comes from food. But what you might not know is that your cholesterol has a lot to do with your family history. VYTORIN treats both sources of cholesterol.

A healthy diet is important, but when it's not enough, adding VYTORIN can help. VYTORIN helps block the absorption of cholesterol that comes from food and reduces the cholesterol that your body makes naturally.

In clinical trials, VYTORIN lowered bad cholesterol more than Lipitor alone. VYTORIN is a tablet containing two medicines: Zetia® (ezetimibe) and Zocor (simvastatin).

Important information: VYTORIN is a prescription tablet and isn't right for everyone, including women who are nursing or pregnant or who may become pregnant, and anyone with liver problems. Unexplained muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. VYTORIN may interact with other medicines or certain foods, increasing your risk of getting this serious side effect. So, tell your doctor about any other medications you are taking.

To learn more, call 1-877-VYTORIN or visit vytorin.com Please read the Patient Product Information on the adjacent page.

Continue to follow a healthy diet, and ask your doctor about adding VYTORIN.

To find out if you qualify, call 1-800-347-7503.

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Treat the 2 sources of cholesterol.

VYTORIN® (ezetimibe/simvastatin) Tablets

Patient Information about VYTORIN (VI-tor-in)
Generic name: ezetimibe/simvastatin tablets

Read this information carefully before you start taking VYTORIN. Review this information each time you refill your prescription for VYTORIN as there may be new information. This information does not take the place of talking with your doctor about your medical condition or your treatment. If you have any questions about VYTORIN, ask your doctor. Only your doctor can determine if VYTORIN is right for you.

What is VYTORIN?

VYTORIN is a medicine used to lower levels of total cholesterol, LDL (bad) cholesterol, and fatty substances called triglycerides in the blood. In addition, VYTORIN raises levels of HDL (good) cholesterol. It is used for patients who cannot control their cholesterol levels by diet alone. You should stay on a cholesterol-lowering diet while taking this medicine.

VYTORIN works to reduce your cholesterol in two ways. It reduces the cholesterol absorbed in your digestive tract, as well as the cholesterol your body makes by itself. VYTORIN does not help you lose weight.

Who should not take VYTORIN?

Do not take VYTORIN:

- If you are allergic to ezetimibe or simvastatin, the active ingredients in VYTORIN, or to the inactive ingredients. For a list of inactive ingredients, see the "Inactive ingredients" section at the end of this information sheet.
- If you have active liver disease or repeated blood tests indicating possible liver problems.
- If you are pregnant, or think you may be pregnant, or planning to become pregnant or breast-feeding.

VYTORIN is not recommended for use in children under 10 years of age.

What should I tell my doctor before and while taking VYTORIN?

Tell your doctor right away if you experience unexplained muscle pain, tenderness, or weakness. This is because on rare occasions, muscle problems can be serious, including muscle breakdown resulting in kidney damage.

The risk of muscle breakdown is greater at higher doses of VYTORIN.

The risk of muscle breakdown is greater in patients with kidney problems.

Taking VYTORIN with certain substances can increase the risk of muscle problems. It is particularly important to tell your doctor if you are taking any of the following:

- cyclosporine
- danazol
- antifungal agents (such as itraconazole or ketoconazole)
- fibric acid derivatives (such as gemfibrozil, bezafibrate, or fenofibrate)
- the antibiotics erythromycin, clarithromycin, and telithromycin
- HIV protease inhibitors (such as indinavir, nelfinavir, ritonavir, and saquinavir)
- the antidepressant nefazodone
- amiodarone (a drug used to treat an irregular heartbeat)
- verapamil (a drug used to treat high blood pressure, chest pain associated with heart disease, or other heart conditions)
- large doses (≥1 g/day) of niacin or nicotinic acid
- large quantities of grapefruit juice (>1 quart daily)

It is also important to tell your doctor if you are taking coumarin anticoagulants (drugs that prevent blood clots, such as warfarin).

Tell your doctor about any prescription and nonprescription medicines you are taking or plan to take, including natural or herbal remedies.

Tell your doctor about all your medical conditions including allergies.

Tell your doctor if you:

- drink substantial quantities of alcohol or ever had liver problems. VYTORIN may not be right for you.
- are pregnant or plan to become pregnant. Do not use VYTORIN if you are pregnant, trying to become pregnant or suspect that you are pregnant. If you become pregnant while taking VYTORIN, stop taking it and contact your doctor immediately.
- are breast-feeding. Do not use VYTORIN if you are breast-feeding.

Tell other doctors prescribing a new medication that you are taking VYTORIN.

How should I take VYTORIN?

- Take VYTORIN once a day, in the evening, with or without food.
- Try to take VYTORIN as prescribed. If you miss a dose, do not take an extra dose. Just resume your usual schedule.
- Continue to follow a cholesterol-lowering diet while taking VYTORIN. Ask your doctor if you need diet information.
- Keep taking VYTORIN unless your doctor tells you to stop. If you stop taking VYTORIN, your cholesterol may rise again.

What should I do in case of an overdose?

Contact your doctor immediately.

What are the possible side effects of VYTORIN?

See your doctor regularly to check your cholesterol level and to check for side effects. Your doctor may do blood tests to check your liver before you start taking VYTORIN and during treatment.

In clinical studies patients reported the following common side effects while taking VYTORIN: headache and muscle pain (see What should I tell my doctor before and while taking VYTORIN?).

The following side effects have been reported in general use with either ezetimibe or simvastatin tablets (tablets that contain the active ingredients of VYTORIN):

- allergic reactions including swelling of the face, lips, tongue, and/or throat that may cause difficulty in breathing or swallowing (which may require treatment right away), and rash; alterations in some laboratory blood tests; liver problems; inflammation of the pancreas; nausea; gallstones; inflammation of the gallbladder.

Tell your doctor if you are having these or any other medical problems while on VYTORIN. This is not a complete list of side effects. For a complete list, ask your doctor or pharmacist.

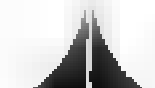
General Information about VYTORIN

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use VYTORIN for a condition for which it was not prescribed. Do not give VYTORIN to other people, even if they have the same condition you have. It may harm them.

This summarizes the most important information about VYTORIN. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about VYTORIN that is written for health professionals. For additional information, visit the following web site: vytorin.com.

Inactive ingredients:
Butylated hydroxyanisole NF, citric acid monohydrate USP, croscarmellose sodium NF, hydroxypropyl methylcellulose USP, lactose monohydrate NF, magnesium stearate NF, microcrystalline cellulose NF, and propyl gallate NF.

Issued November 2004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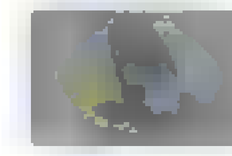
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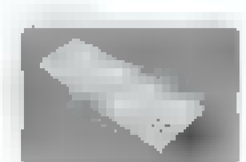
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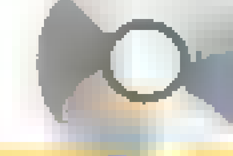

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Wildlife

Full-time ecologists work at Wilderness Safari's campsites in Zambia, Botswana, Namibia, South Africa, Malawi, Zimbabwe, and the Seychelles.
wilderness-safaris.com

At Campi ya Kanzi's luxury tent camp in Kenya, activities for tourists include following wildlife on foot with local Maasai trackers.
maasai.com

Volunteers with Save the Elephants can shoot a tranquilizer dart, assist as scientists attach a collar on an elephant, or help buy radio tracking equipment, then follow the movement of elephants online.
save-the-elephants.org
eco-hunt.co.za

Culture

Historical points of interest from the slave trade—such as Goreé Island off Dakar, Senegal, and the ancestral home of *Roots* author Alex Haley in Gambia—are on the itineraries for tours offered by groups that specialize in showing Africa to Americans.
hendersontravel.com
accentingafrica.com

Explore Egypt's bustling bazaars and ancient pyramids, take a look at Moroccan life in the city of Marrakech and the Atlas Mountains, or visit spice plantations on the island of Zanzibar along with these companies committed to ecotourism.
gapadventures.com
wildernesstravel.com

Just off the coast of Cape Town, onetime inmates of South Africa's Robben Island show visitors around the apartheid-era prison—now a museum. The cell in which its most illustrious former resident, Nelson Mandela, spent 18 years as a political prisoner is part of the tour.
www.robben-island.org.za

PICKS

African Crafts

Buying from these African craft websites puts the lion's share of the proceeds in the hands of African artisans:

- **Eshopafrica.com** This Ghana-based fair-trade website helps African craftspeople build their businesses by offering products ranging from traditional kente cloth and other textiles to custom-made coffins. Profits help pay for education and health care.
- **Beadsforeducation.org** The Dupoto Women's Group of rural Kenya sells traditional Maasai beaded jewelry, baskets, and other goods. All of the site's profits go to its artisans, who use a portion to pay for their daughters' educations.
- **Anansevillage.com** This online shop offers Ghanaian chocolate, Swazi baskets, and traditional musical instruments, as well as crafts and clothing from several African countries.

YOU CAN LINK directly to these featured organizations at Online Extra at **ngm.com/africa**.

STEVE AND MICHELLE HENLEY, SAVE THE ELEPHANTS TRANSBOUNDARY ELEPHANT RESEARCH (TOP LEFT); CRAFTS FROM *AFRICANCRAFT.COM*; HAMILL GALLERY OF AFRICAN ART, BOSTON

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■ FIELD NOTES Have you ever wondered how our photographers get their images or how writers find their stories? Get tips and find out what it's like to go on assignment. Read the field notes from more than 50 feature stories about Africa at ***ngm.com/africa.***

Photographer George Steinmetz on assignment in Kenya poses with Maasai herders after landing his ultralight.

Wildcam

We've trained a Web camera on a remote watering hole called Pete's Pond so you can watch the animals of Botswana's Mashatu Game Reserve 24 hours a day. Log on to view a changing scene of lions, elephants, wildebeests, hyenas, cheetahs, and more. Keep your eye on Pete's Pond at ***ngm.com/wildcamafrica.***

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■ **Shattered Sudan: Drilling for Oil, Hoping for Peace** Go to the heart of a 50-year fight for land and power.

■ **Megatransect Across Africa** Immerse yourself in Mike Fay's 2,000-mile, 456-day epic walk across the heart of the continent.

■ **Without Boundaries: Uniting Africa's Wildlife Reserves** Find out more about this dream of Nelson Mandela's.

■ **Last Stand of the Bushmen** Learn about southern Africa's first people and their struggle to survive.

For more stories and photos of Africa, go to NATIONAL GEOGRAPHIC's online archives at *ngm.com/africa.*

PHOTO BY ALAIN ARNOUX. MAP: THROUGH ITS HUMAN FOOTPRINT PROJECT, THE WILDLIFE CONSERVATION SOCIETY HAS CREATED A GLOBAL MAP OF HUMAN INFLUENCE ON THE EARTH'S SURFACE. WCS STAFF USED SATELLITE IMAGERY AND CENSUS DATA TO MAP POPULATION, LAND USE, ROADS, LIGHTS, AND OTHER VARIABLES. PROJECT LEADERS: ERIC SANDERSON, KENT REDFORD, WCS; MARC LEVY, CENTER FOR INTERNATIONAL EARTH SCIENCE INFORMATION NETWORK, COLUMBIA UNIVERSITY

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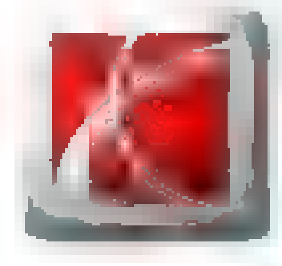

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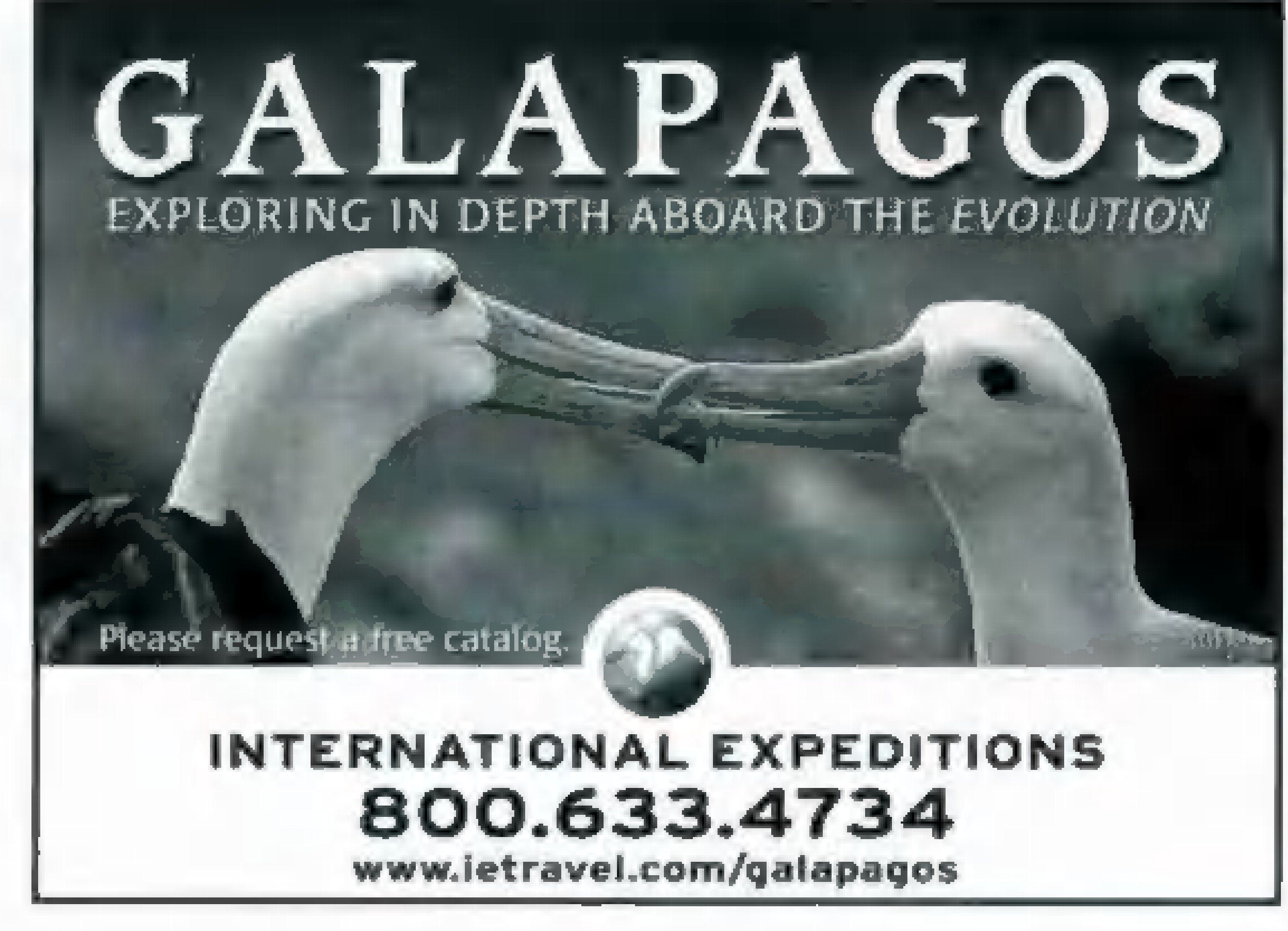

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Flashback

Teddy Roosevelt poses with a rhino he took down during one of the biggest trophy-hunting safaris ever mounted.

T. R.'s Bully Shot

Soon after leaving the U.S. Presidency in 1909, Theodore Roosevelt left for Africa. He'd pledged a "fine collection" of wildlife trophies to the Smithsonian Institution. Though his request for funding noted, "I am not in the least a game butcher," thousands of animals were killed on his expedition. T. R. described his conquests in the January 1911 GEOGRAPHIC, where this rhino photo ran. "While a rhinoceros's short suit is brains," he wrote, "his long suit is courage. He is a particularly exasperating creature to deal with." —*Margaret G. Zackowitz*

FLASHBACK ARCHIVE Find past photos and send e-greetings, in Departments at **ngm.com/africa.**

PHOTO BY KERMIT ROOSEVELT

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